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The Mining Journal

LONDON, APRIL 29, 1960

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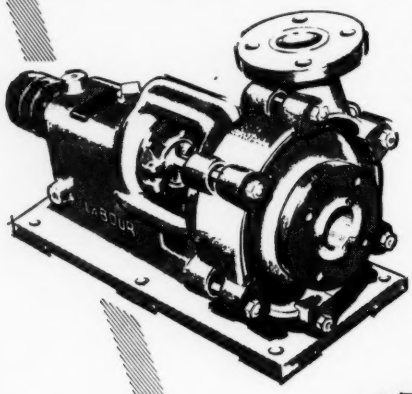

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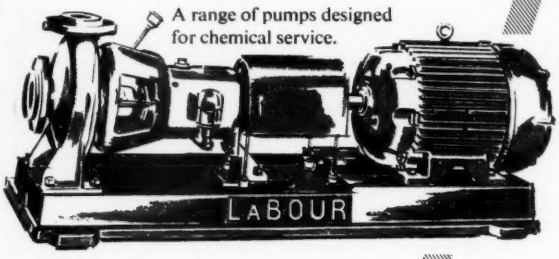

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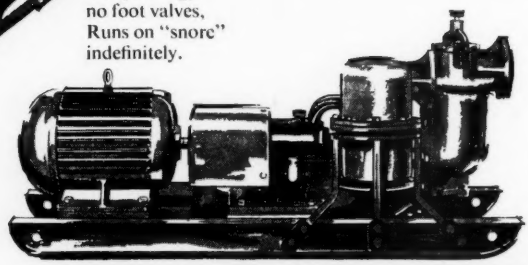

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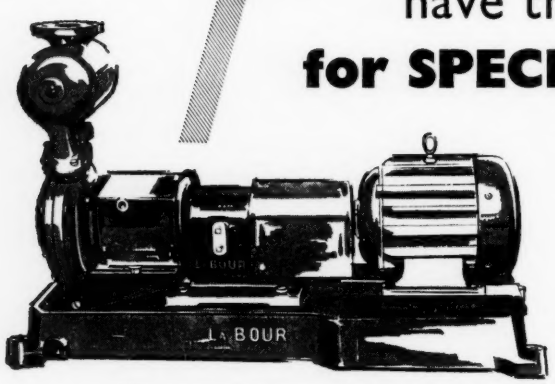

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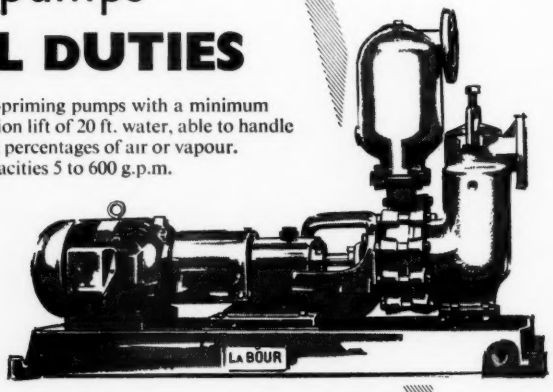

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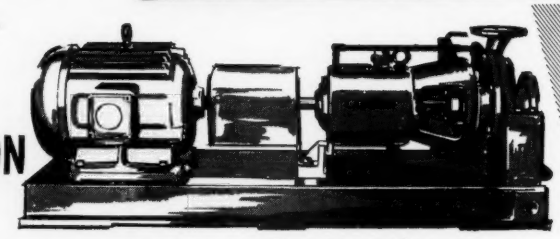

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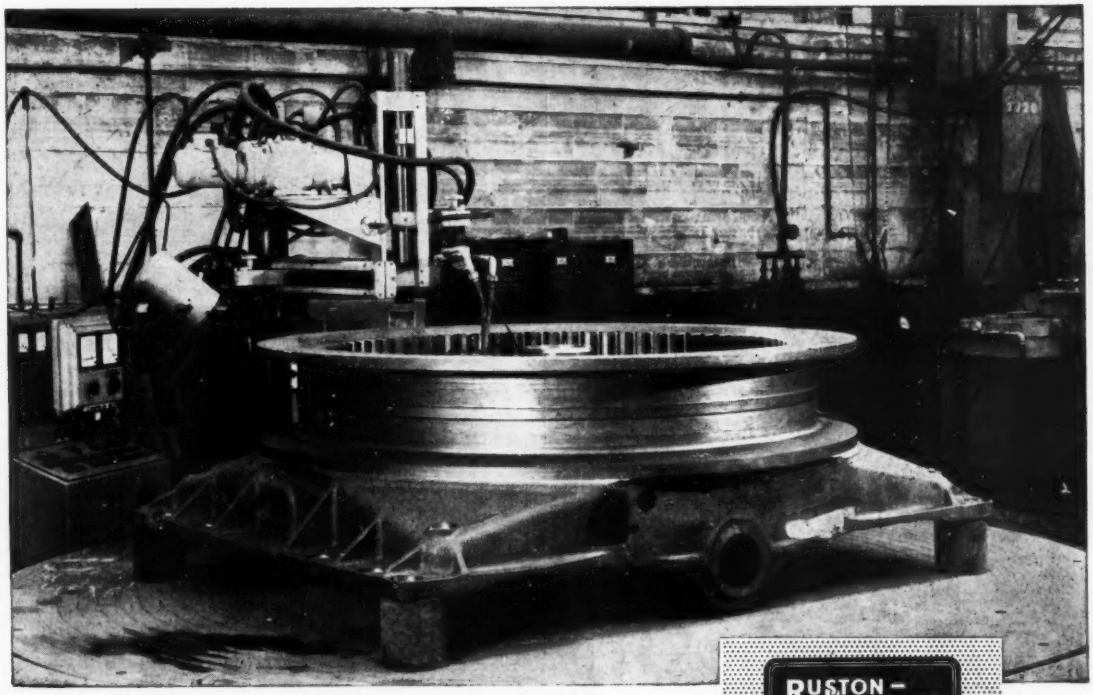

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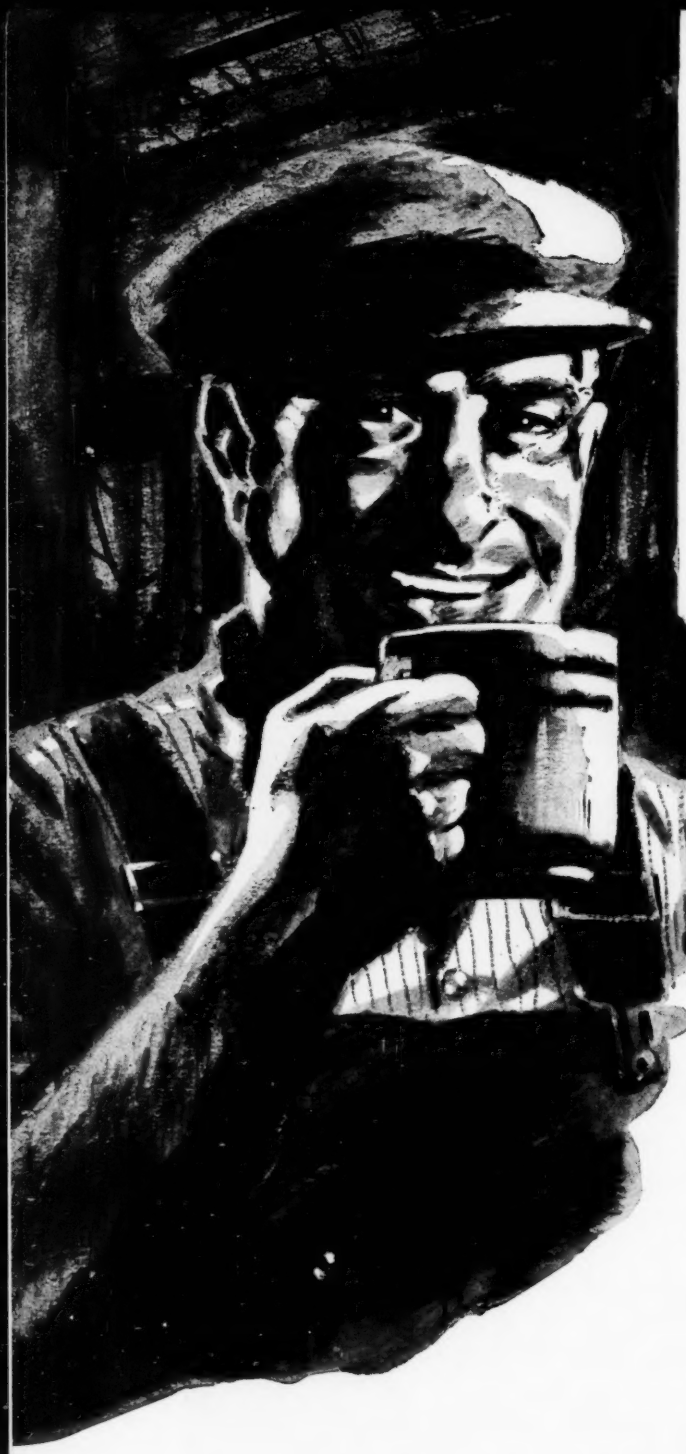

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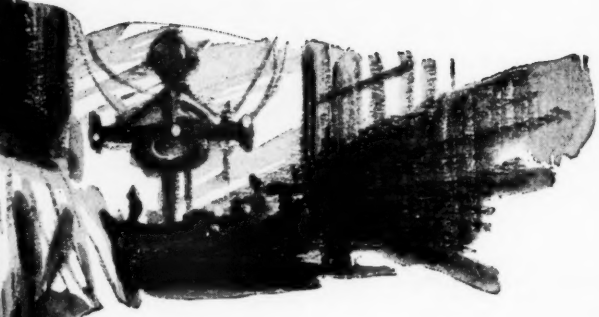

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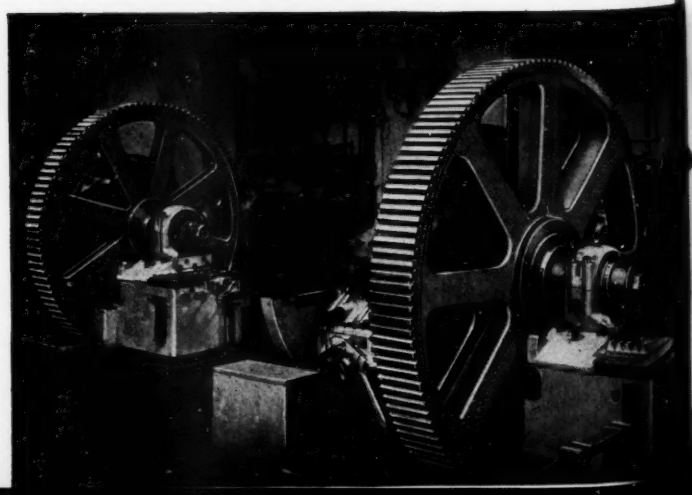

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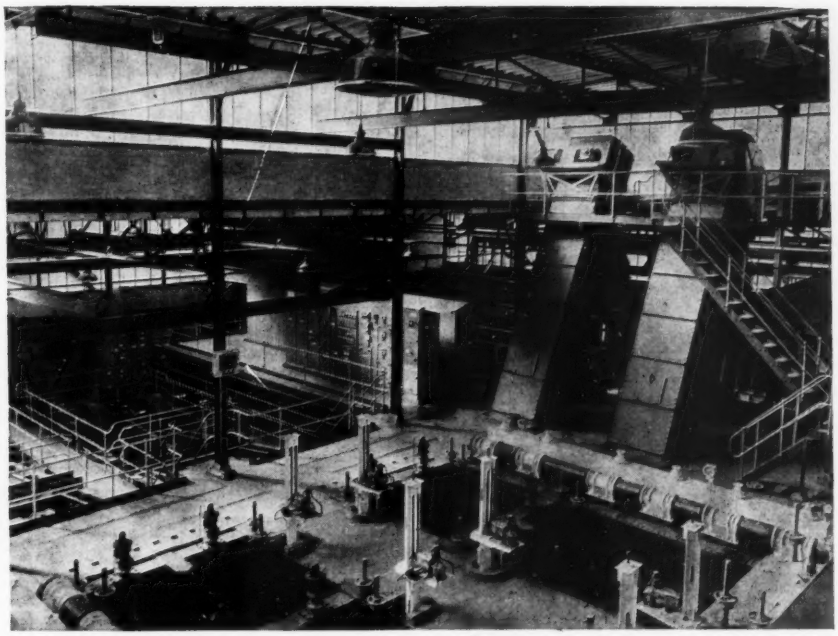
The top floor of the new 500 t.p.h. Baum plant built for the National Coal Board at Killoch Colliery. Photograph by kind permission of National Coal Board.



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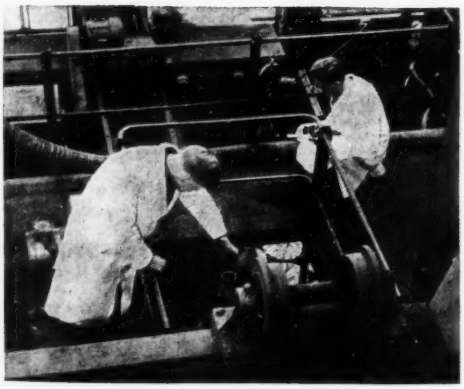

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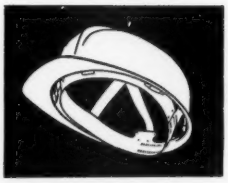

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The Mining Journal

London, April 29, 1960

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Lead-Zinc Problems in Election Year

THE battle of American lead-zinc import quotas is temporarily stale-mated, and the various contending forces have disengaged in order to regroup. It is inconceivable that there will not be another clash — for this is election year. The contenders for the mid-western States will hardly dare show their noses in Nevada, Utah, Arizona, Montana and other such places unless they are plainly and recently bloodied on their constituents' behalf. But this is a most unusual election campaign and though the boys from the mid-west can be expected to run true to form it is unlikely that either the Administration or the bosses of the Democrats will act in 1960 as they have done in bygone election years.

To understand why, it is necessary to go back over the past. The first big struggle of the industry came in 1953 — in fact just as soon as Eisenhower had got the Republicans back into office. Next year up came the Tariff Commission with a recommendation of a 50 per cent tariff hike but Eisenhower preferred instead to rely on a bigger stockpiling programme. When the stockpiling faded out, and the Tariff Commission was split on its recommendations after a fresh study, Eisenhower imposed import quotas in October 1958. But doubts about their efficacy, and in particular the belief that they merely encouraged the import of lead and zinc in processed form encouraged the industry to have another attempt to get the higher tariffs it believes it has been entitled to since 1954.

This history shows the extreme reluctance of the Eisenhower regime to use higher tariffs to assist the domestic lead-zinc industry. That Eisenhower's alternative schemes have not been successful (and, at least so far as the stockpiling went, not particularly intelligent either) is beside the point. The Administration is aware of the unfortunate repercussions of higher tariffs ; and it also seems to have the conviction that if only the lead-zinc industry could get over a sticky patch, the natural growth of demand would put things right for it. For a short term malaise, higher tariffs have seemed altogether too permanent as well as bad for foreign relations.

The history of the latest inquiry also has its illuminating points. It began in August of last year when a group of Congress men were demanding an inquiry under the escape clause. An escape clause inquiry would have involved the Tariff Commission in making some sort of recommendation. Hardly was the demand put forward before the Tariff Commission began a study of its own under clause 332 of the Tariff Act 1930. This is the sort of inquiry that does not terminate in recommendations ; and the Commission lost no time in pointing this fact out. Smartly, the mining Senators retaliated. They passed a resolution ordering the Tariff Commission to make a study under clause 332 and then to make recommendations. The upshot has been that the Tariff Commission, having made its study, decided by four to two that it would not be legal to do what the Senate had instructed it to do ; clause 332 simply does not

permit recommendations to be made. And there, for the time being, the matter stands.

The first point to note is that the Commission went ahead with its inquiry (under an illegal instruction) and did not question the Senate's order until it was over. If it had first tackled the matter of the legality of the order it would have reached a decision much earlier and given the mining interests time to rethink their plans. As it is, a good deal of time has been lost. In fact precious little time remains for Congress to act. Nobody will want to be kept hanging about Washington debating the well-known problems of the lead-zinc mining industry when there is electioneering to be done.

Yet another point was that, only a matter of days before the Commission issued its findings, Mr. Fred Seaton, Secretary of the Interior, said at a Press conference that he thought that the quotas would continue for the rest of 1960. He was rapped by the smelting interests for this remark (they had naturally wanted import regulation by tariff rather than by quota) which it was said prejudged an issue before the report was out. But Mr. Seaton's attitude does seem to be the attitude of the Administration. It is still fighting shy of higher tariffs. It may believe the quotas unfortunate, but it can evidently see nothing better. In any case, it apparently believes that if the rest of the economy can be got going lead and zinc will pick up strongly as a result. The snag is that the economy has not leaped ahead after the steel strike as was thought. But that still does not mean that lead-zinc is worth preferential treatment to the detriment of the rest of the economy.

There are other factors arguing against any substantial additional protection to the American lead-zinc industry at this time. One is that Eisenhower has just been to South America where his reception was anything but wildly enthusiastic. He cannot be in any doubt of the need to get the United States more respected in those countries, or of the very unfortunate consequences of higher tariffs on lead and zinc especially in Peru. Castro still stands in the picture as a fearful warning.

Then again, this is a most unusual election year. Normally, the Administration and Opposition are falling over each other promising the moon to every useful sectional interest. The mining industry could normally expect to pick up something. But in fact Eisenhower is the first president who cannot stand again. He has no need to buy votes. But perhaps he should buy them for his party? Not necessarily. He had intended giving his blessing to Nixon at a late hour (as a simple precaution against Nixon taking an independent line). But in fact his approval of Nixon was prematurely disclosed, and his hold over his vice-president went with it. But if Eisenhower's hold went, so did his obligations. Eisenhower is free to take the stern path of duty and righteousness that he has always preferred.

But what of the Democrats? Should not they be promising the moon to the lead-zinc industry? No indeed. They are all too much involved in a bigger issue. Dare they put a Catholic on the ticket? and now that Kennedy has made the running in the way that he has, dare they leave a Catholic off ? The Democrats have far bigger things on their minds than the lead-zinc industry.

The situation is about as unreal as it could be. But there is no doubt about the Administration's attitude. It does not want at this stage to become involved in any sweeping new plan to aid the lead-zinc mining industry. This would not preclude the possibility of some sort of direct assistance to some of the worst hit mines. But if it can fight off higher tariffs, or an extension of the quotas into processed metal, it is a reasonable assumption that that is what it would prefer.

MINING IN SOUTHERN RHODESIA

According to the Annual Report for 1959 of the Director of Mines for Southern Rhodesia, the value of mineral production was £25,003,365, or £328,367 lower than in 1958. This not unexpected drop was due chiefly to reduced world industrial activity and depressed base mineral markets. The major base mineral products, asbestos and chrome, were particularly hard hit by the severely competitive market resulting in lower prices, but the decrease in these exports was offset by the rising production of copper which is growing in importance. Because of world conditions some smaller producers were forced, temporarily, to cease operations.

Base mineral reserves have continued to attract the international attention of the large exploration companies, with copper, nickel and iron ore deposits as the centre of interest. No fewer than 14 applications for exclusive prospecting orders were received from companies including Rand Mines, Rio Tinto, Johannesburg Consolidated Investment Co., Messina (Rhodesia) Development Co. to search for copper, primarily, and other base minerals covering 1,500 sq. miles.

During the year, £254,298 was spent by concession holders in prospecting their areas, bringing the progressive total to £6,109,144 since 1947.

In 1959, the Southern Rhodesian asbestos industry continued to be affected by severe competition from expanding Canadian production, growing exports to Europe from the Soviet Union and a stronger emphasis on quality as a result of a world excess of supply over demand. There was, however, some indication of possible market improvement at the close of the year, though prices offering were generally lower by about 10 per cent. It was expected that production would be maintained in 1960 under continuing difficult, but perhaps slightly improving, conditions.

Asbestos production for 1959 was 119,699 s. tons valued at £7,405,258 representing a decrease of 7,416 s. tons over 1958 with a loss of £188,468 in production value. Mines controlled by the Turner and Newall group accounted for 67 per cent of the total production and 78 per cent of the total value, the rest being produced by smaller operators. Increasing attention has been given to well prepared short fibres for the plastics industries and Vanguard Asbestos Mines has placed such fibres on the world market in competition with the standard Canadian product. Production of these grades is to be increased both at this and another mine within the group. Government assistance is being provided by waiving royalties on the Nos. 6 and 7 fibre grades.

Despite rising costs and a static product price, gold production has remained steady in Southern Rhodesia for a number of years and it is still second only to asbestos in production value. In 1959, production was 566,883 oz. valued at £7,081,264, compared with 554,838, valued at £6,950,302 in 1958, and deposits continue to command the interest of the larger mining groups in their prospecting activities. Intensive prospecting is being based on modern methods and is being applied particularly in areas which have yielded high gold returns from small producers in the past, more attention being paid to structural control in the emplacement of ore zones and to studies of groups of small mines from this aspect.

During the year, the Barberton group was acquired by Dawn Gold Mining Co., a subsidiary of New Consolidated Gold Fields, and a 90 per cent interest in Cam and Motor Gold Mining Co. (1919) Ltd. was acquired by Rio Tinto (S.R.) Ltd. Rio Tinto has also acquired other smaller interests in the Gatooma area and is actively prospecting there.

Chrome ore production in 1959 was 543,108 s. tons, valued at £3,030,565, compared with 618,845 s. tons, valued at £3,976,538 in 1958. The development of adverse market

conditions, due to Russian competition and aggravated by the U.S. steel strike, are blamed for the decline in production. Smaller operators were seriously affected and, with market conditions uncertain at the close of the year, it was doubtful whether the 1960 output would reach the 1959 figure.

A feature of the S. Rhodesian chrome industry was its acquisition of a major share in the United States market, replacing Turkey as leading supplier, despite the fact that overall U.S. imports for 1959 were lower. Of 582,340 tons of metallurgical grade chromite imported by the U.S. during the first nine months of 1959, 291,896 tons, or 50.1 per cent was from S. Rhodesia, as against 99,596 tons, or 17.1 per cent, from Turkey. Some 75 per cent of Rhodesian shipments were, however, by captive mines.

Operating below its production capacity of five millon tons per annum, the Wankie Colliery Co. produced3,893,878 s. tons, valued at £3,839,406, compared with 3,654,109 s. tons valued at £3,327,860 in 1958. It supplied the coal and coke requirements of the Federation as well as the markets of Belgian Congo and Portuguese E. Africa. Little success attended efforts to establish markets for good quality coking coal overseas. In November 1959, the pit-head price of coal was re-determined at 20s. per ton an increase of 6d. per ton on the previous price. New Consolidated Goldfields Co. contemplate the establishment of another colliery at Bubye to produce good quality coking coal, providing transport difficulties can be overcome.

Of comparatively recent origin in Southern Rhodesia, the copper industry is now becoming established and production is expected to rise steadily as more producers enter the field. In 1959, 12,017 s. tons of metal, valued at £2,007,728 were produced compared with 8,430 s. tons valued at £1,003,692 in 1958. Interest in copper has been stimulated by the steady rise in production of M.T.D. (Mangula) Ltd. The installation of a smelter at Alaska by an associated company is expected to be completed by September 1960.

A feature of nickel production in Southern Rhodesia in 1959 was the exploration and development of the Bindura deposit by Anglovaal Rhodesian Exploration Co. and negotiations with Shimuro Kako Ltd. for the erection of a smelter.

Lithium production was depressed in 1959 by world market conditions and the Bikita Minerals (Pvt.) Ltd. mine, one of the major producers, was faced with probably going on a care-and-maintenance basis in 1960. At the end of 1959, however, this company exercised its option on the adjoining lithium mineral mine of Geo. Nolan (Pvt.) Ltd., also a major producer so as to be able to supply all types of lithium ores to the glass and other industries and to manufacturers of lithium chemicals. The newly acquired section of the ore body contains large reserves of high grade petalite, spodumene and amblygonite.

S. Rhodesian tin production was increased to 641 tons of metal and 53 tons of concentrate in 1959.

During 1959, a £70,000 experimental reduction plant was established at the Darowa phosphate deposit by African Explosives and Chemical Industries (Rhodesia) Ltd. The plant is producing about 1,000 tons of phosphate rock concentrate a month.

The discovery of small, but superb quality, emerald stones in the Belingwe District has attracted world wide interest. Because of their small size, the sale of these " Sandawana " emeralds is posing problems of some complexity. The controlling interest in the deposit has been acquired jointly by Rio Tinto and Shepstone Estates.

As a result of experiments conducted over the last two years it has been discovered that the addition of silica to antimonial concentrates prior to roasting at the government roasting plant greatly improves the recovery of gold. A plant scale test based on this discovery was begun in December 1958 and over a period of six months the recovery of gold was 89.38 per cent compared with 83.41 per cent for the six months prior to the addition of silica. Blending with silica has now become established practice. During 1959, 9,131 tons of concentrates were purchased, 8,821 tons treated and 24,955 oz. of gold recovered.

The report of the Working Party set up by the Minister of Mines to consider amendments to the mining law was published in February 1959 and was generally well received apart from strong opposition from the farming community to the proposals for access by miners to classes of land at present reserved against prospecting. Discussions on this subject have ensued, pending the outcome of which the Government has reserved final consideration of the report.

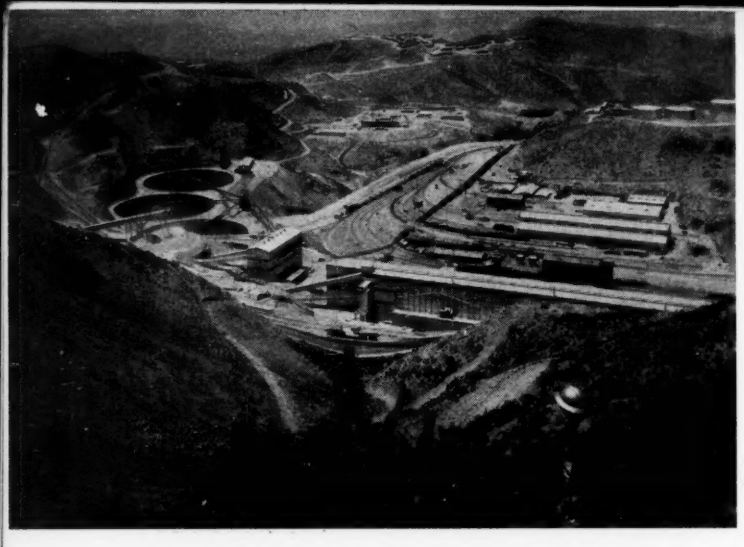
AUSTRALIA'S APPETITE FOR STEEL

The accelerated demand in Australia for steel is such that the Broken Hill Proprietary Co. Ltd. is unable to supply the country's requirements, despite the heavy capital expenditure of recent years which in the last six months of 1959 reached £A13,500,000 for the half year. In the past three years the steel ingot production capacity of the Newcastle and Port Kembla works was increased by 1,157,000 tons. The two works are now producing at the rate of 3,500,000 tons of ingot steel per year.

To meet the situation, the iron smelter at Whyalla, South Australia, is being expanded for the production of steel ; at Port Kembla, New South Wales, a new steel furnace, with a capacity of 300,000 tons per year is to be built ; the first portion of a third section of by-product coke ovens was expected to be in use during March, and the second sinter plant was to be completed in April. A new cold rolling mill and electrolytic tin plant works are being constructed. A tenth hot dip tin pot has been authorized, and this will raise tin plate capacity to 118,000 tons per year.

These constructional developments call for increased ore production, and the establishment of new ore supplies. Following extensive geological examination and diamond drilling, the iron ore deposits of Koolan Island, in Yampi Sound, Western Australia, are to be developed at a cost of £A6,300,000 The plant to be constructed will have a capacity of 2,000,000 tons annually. Search for new deposits of ore has been actively carried on by the company. The Government of Western Australia has been diamond drilling known ore occurrences to establish their economic value, and the South Australian Government is commencing a low level aerial survey over an area of 326 sq. miles of Eyre Peninsula, where an earlier high-level survey had registered magnetic indications. In the vicinity of the company's iron ore quarries at Middleback Ranges, on Eyre Peninsula, are very large occurrences of taconite on which pilot work is proceeding to determine methods for their ultimate utilization.

With the heavy demand for steel and the intensity of the search for ore deposits, the prospect that Western Australia will succeed in its request for a permit to export iron ore, appears very remote. The Broken Hill Proprietary Co. has made no general increase in the price for steel since May, 1956 ; but in the intervening 3½ years there have been heavy increases in the costs of wages, materials and services, which have been met by increased productivity, and increase in price obviated. The basic wage rise in 1959 and the direct and indirect effects of the decision in the Margins Case, have necessitated increases in prices averaging 6 per cent.



Toquepala Project

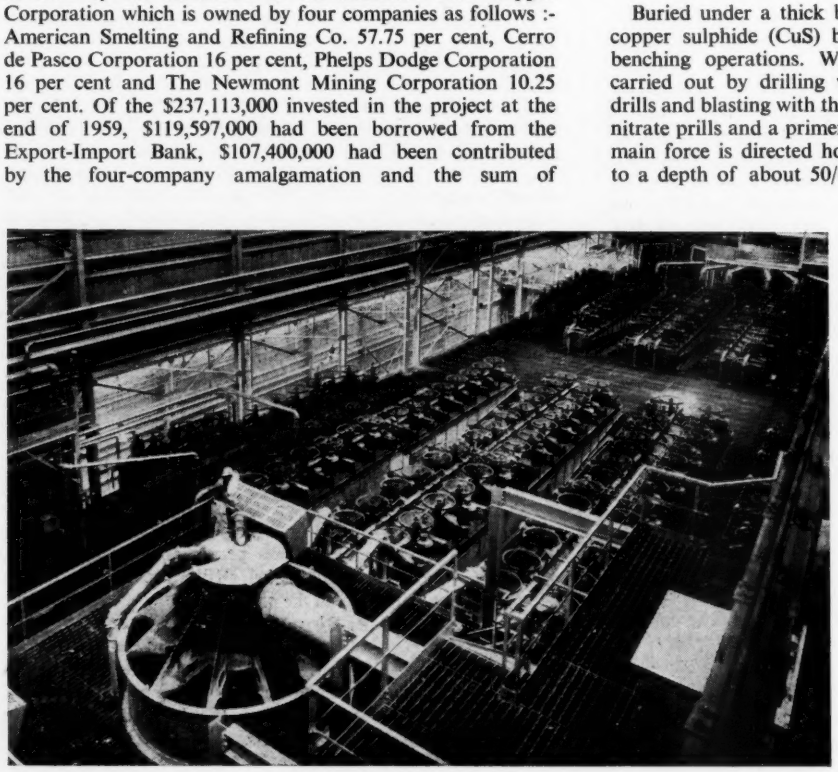
SCHEDULED for completion in May 1960, the Toquepala project of the Southern Peru Copper Corporation, in which no less a sum than $237,113,000 has already been invested, was in fact completed in 1959 with an initial planned output of ore from the mine of 30,000 tons a day to be processed to 1,000 tons of concentrate and smelted into 300 tons of blister copper. The ultimate annual production capacity of the Toquepala mine alone is 140,000 tons of blister copper, and, in addition to this vast potential involving about 400,000,000 tons of ore reserves, other undeveloped ore reserves totalling 600,000,000 tons have been discovered at nearby Quellaveco and Cuajone.

Although the huge Toquepala ore deposits have been known since 1870, their low (one per cent) mineral content has, until recently, prohibited economic extraction. In 1937, the Peruvian mining company Cerro de Pasco, took an option on the property but, in 1948, the property was purchased by the Northern Peru Mining and Smelting Co. an affiliate of the American Smelting and Refining Co. who began opening it up by building roads, etc. A legal dispute over the title to the land ensued, however, and was only solved in 1956 by the formation of the Southern Peru Copper Corporation which is owned by four companies as follows :- American Smelting and Refining Co. 57.75 per cent, Cerro de Pasco Corporation 16 per cent, Phelps Dodge Corporation 16 per cent and The Newmont Mining Corporation 10.25 per cent. Of the $237,113,000 invested in the project at the end of 1959, $119,597,000 had been borrowed from the Export-Import Bank, $107,400,000 had been contributed by the four-company amalgamation and the sum of $10,116,000 had been borrowed from suppliers of equipment.

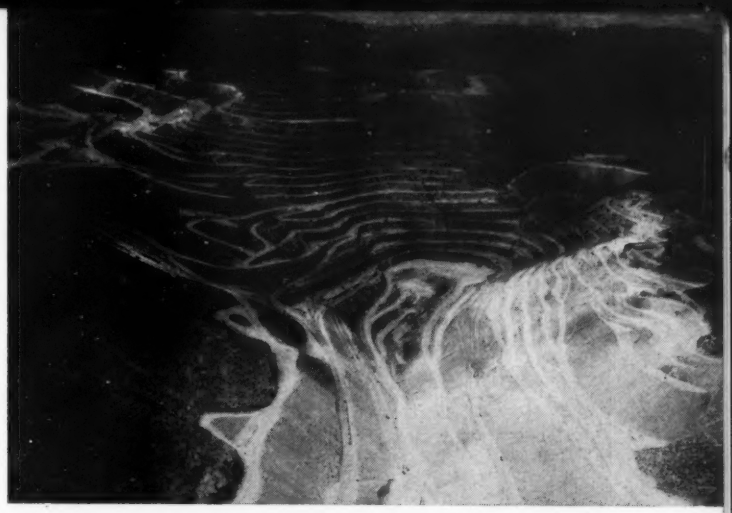
Between a quarter and one third of Southern Peru's output will be further treated in Europe. The Norddeutsche Afinerie will buy outright blister copper roughly 98/99 per cent pure as it comes from the smelter before refining, while Société Générale des Minerais de Hoboken will buy toll ore, smelt it and return it to Southern Peru for sale. Most of Asarco's 57.75 per cent share of the remaining production will go to its refineries at Perth Amboy, N.J. and Baltimore, Maryland.

To make the uninhabited desert at Toquepala at an elevation of 10,600 ft. above sea level into an opencast mine required the stripping of more than 125,000,000 tons of overburden. Other necessary developments included the construction of a concentrating mill, a townsite and other facilities near the mine, the installation of a 54-mile water supply pipeline from Lake Suche, 15,000 ft. up in the high Andes, the construction of a 114-mile railway to the mine from the sea coast at Ilo, the construction of a smelter and power plant and the construction of port works and a townsite at Ilo, as well as warehouses and other facilities.

Buried under a thick bed of igneous rock, the 1 per cent copper sulphide (CuS) bearing rock, has been exposed by benching operations. Widening of the benches has been carried out by drilling with Bucyrus Erie and Joy rotary drills and blasting with the use of a mixture of oil, ammonium nitrate prills and a primer to produce a dull explosion whose main force is directed horizontally. Holes have been drilled to a depth of about 50/60 ft. some 10 ft. from the terrace



Above, at top left of this page, is shown the Toquepala mill. Below, alongside at left, the flotation section of the mill



in Production

edge. Clearing of the debris after blasting has been carried out by 10/12 P. & H. No. 1800 electric power shovels which loaded Mack and Dart trucks equipped with Cummins diesel engines, as well as Euclid trucks, which carried an estimated 25 tons per load to spoil dumps.

The crude ore is removed from the opencast mine in pieces up to 60 in. in size and transported the four miles to the concentrator by standard gauge, double-track railway, which also has side tracks for waste disposal. The rail side dump wagons are loaded from trucks at the mine edge rather than by shovels on the mine levels. This is intended to keep a constant flow of ore running between the mine and concentrator. During production much igneous waste rock has still to be removed to keep the mine in operating condition, the proportion of ore and waste to be hauled being roughly calculated as one to four.

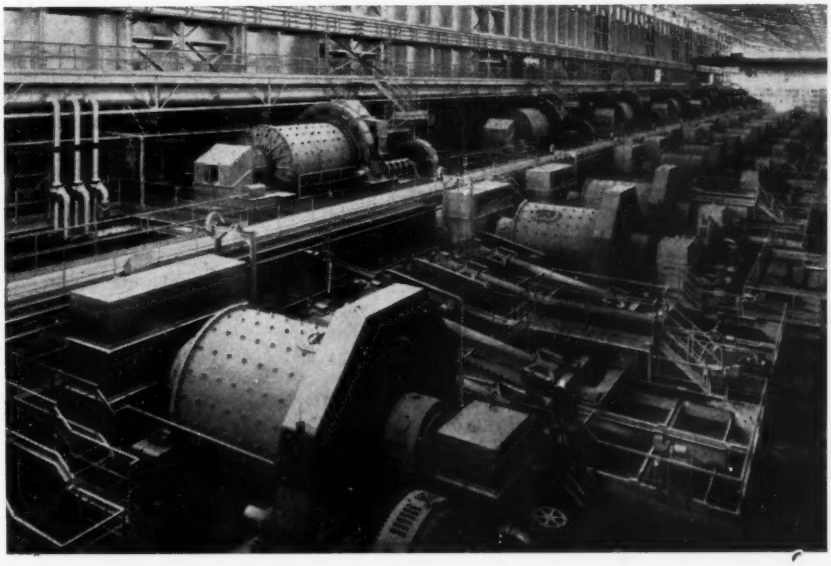
Because of the mine's isolated position, its maintenance and repair shops have had to be comprehensively equipped and these, together with the mine stand-by power plant, are located close to the foot of the pit.

At the concentrator and mill area, the run-of-mine ore is crushed to maximum 8 in. material by an eccentrically oscillating cone in the primary crusher and is delivered by two conveyor belts to a storage area from which the ore is reclaimed by other conveyor belts leading to the secondary and tertiary crushers. From these the minus 1 in. ore is belt-conveyed to a fine ore storage bin and thence to the rod and ball mills with attached classifiers, where it is prepared for the flotation process.

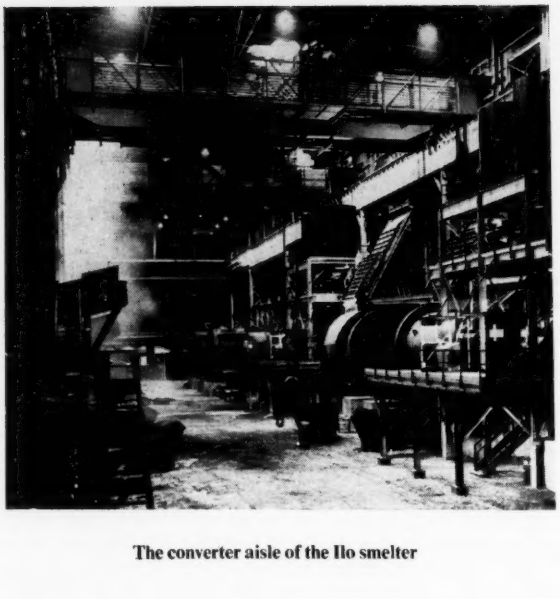
Lime for the flotation process is obtained from a 15-km. stretch of Coquina sea shells on the beach near Ilo, being transported as return material on the railway connecting the smelter with the coast at Ilo. After the shells have been burnt, the resultant lime is introduced together with the ore and other reagents, into the rod and ball mills, from which the copper-bearing pulp overflows into the flotation cells, where the concentrate is collected and air emulsified to a bubbly froth. The copper sulphide rises to the surface for convenient separation from the non-mineral bearing material and is semi-dried as 30 per cent concentrate. The remaining tailing flows out of the end of the cells and is conducted by wooden and metal pipes to a water recovery plant, whence it is pumped to a special tank for recovered water located near two 1,500,000 gallon fresh water tanks just above the mill area. From the recovered water tank the water is fed back to the mill.

To supply fresh water, four Worthington diesel-driven pumps have been erected on floating structures on Lake Suche. Used two at a time, they pump water from the bottom of the lake into the 50-km. concrete pipeline for transportation to a de-aerating station at Cerro Pelado, whence steel pipes take the water to the Pampa de Vaca reservoir above Toquepala.

The 30,000-ton-per-day Stears Roger designed flotation mill and crushing plant has been built by Cia. Utah Pacific Ltd. and Cia. Construction Emkay del Peru, joint venturers, who held the construction contract covering the entire project except the mine stripping and pier construction at Ilo.



Above, at top right of this page, is an aerial view of the Toquepala pit. Below, alongside at right, is the grinding bay of the mill



The converter aisle of the Ilo smelter

From the flotation process, the concentrate is transported 114 miles by rail to the smelter on the coast where it is smelted down as 98/99 per cent pure blister copper. This is sent by rail to the port of Ilo, 11 miles away, for transhipment by boat to Europe and the U.S. refineries where it is electrolytically refined for commercial use. The smelter has an annual capacity of about 140,000 tons of blister copper. Power is provided by a fuel-oil-burning, thermo-electric plant, transmission lines also being connected to the mine and mill. Up to the time of the installation of the smelter power house, temporary diesel-electric generators had been used at the mine and these will be retained as an emergency "stand-by." They consist of five G.E., 1,250 kW, 2,400 V, 60 cycle generators driven by water-cooled Nordberg diesels.

Four Alco 130-ton, 1,800 h.p. locomotives are used on the mill-to-smelter railway line to take the 30 per cent concentrates to Ilo and return to the mill site with crushed lime and other supplies. Three locos are used together to pull a 30-wagon train, which makes one round trip daily, the remaining loco being retained as emergency stand-by. Two 65-ton G.E. and one 45-ton G.E. locomotives are used for switching in the smelting area, for handling slag and for switching in the Ilo Port area.

Although, when the Toquepala project began production on January 1 this year, the copper market was far different from that prevailing at the time the decision to go ahead with the scheme was taken, the Southern Peru Copper Corporation are looking to the future with some degree of confidence. This is based partly on the long-term German contract already mentioned and partly on the fact that mining costs in the Andes are extremely low. A cost of under 11 c. per lb. has, in fact, been mentioned as likely to apply to the Toquepala product.

In the past, Asarco, which holds the lion's share of the capital of Southern Peru Copper Corporation, has been primarily a smelter and refiner of metals, processing lead, zinc, copper and gold and silver. Because producers have more and more been processing its own ore, however, Asarco has been forced to break with their established practice and enter the primary production field. This they have done in a big way in Peru. Toquepala is claimed to be the largest single new copper venture in history and may place that country among the seven leading copper producers of the world.

A MINERAL RESOURCES POLICY FOR BRITAIN—II

WHAT MACHINERY EXISTS OR

IN his foreword to the published proceedings of the I.M.M. symposium on "Mineral Resources Policy" which was held in London in September of 1955, the Chairman noted that "the consensus of opinion expressed by the contributors appeared to be in favour of;

(a) The formation of an Advisory Panel that would give guidance to the government on short-term and long-term policy regarding mineral development and use;

(b) The provision of adequate facilities for ore testing and mineral processing."

It is interesting to note that in the four years following the Symposium steps have been taken with the setting up of the Warren Spring Laboratory at Stevenage, to meet the latter requirement, but that nothing very obvious has been done about the advisory panel, or about the mineral statistics and information bureau which, as argued in the first article of this series, would be required as support to such a panel.

The more general ways in which a mineral resources policy advisory panel would be of service to the country have already been discussed. In addition to providing informative background, on which government and industry can base actions and decisions, there are some areas in which a policy panel, supported by its information bureau, would be expected to provide strong direction to the government. Included here would be research in the fields of mineral development, processing and use; the recruiting and training of men to work in all phases of the mineral industry, both at home and abroad; and the financing of mineral development and production, again both at home and abroad, to assure that our long-range supply will be adequate, smooth-flowing and economical.

At present we do not have the facilities to cover these areas, but as Mr. Oliver, the keynote speaker at the 1955 Symposium implied, "in a number of directions the machinery and the information already exist, if only they can be brought together and put to use."

What, in fact, have we got ready to hand?

STATISTICS

The Board of Trade

The Board of Trade is the main statistical section of the British Government, and this is the agency from which government departments get much of their information on mineral resources and to which one may well be referred with general questions having to do with mineral development. In their Industries and Manufactures Department they have specialists who deal with minerals as commodities, and who compile and analyse mineral statistics. This is done on the basis of end use, country of origin, etc., not on the more fundamental basis of long-range reliability of supply, changes in supply and use patterns, etc. Again in the 1955 Symposium Mr. Oliver noted that "The Ministry of Supply and Board of Trade had specialized departments and officials for overlooking the supplies of some raw materials for industry, but apparently a large number of commodities, including metals and minerals, had been left to look after themselves."

It is to be assumed that the Board of Trade does what it is asked to do by the government, and handles mineral statistics in the way that it handles other materials. It could

POLICY MAKING ?

By JAMES F. McDIVITT

This is the second of a short series of articles by Professor James F. McDivitt, on the need for a British mineral resources policy. The purpose of this series was set out in some detail in an introductory note accompanying the first article which appeared last week. Both *The Mining Journal* and the author are indebted to the British Mining Equipment Export Association for permission to incorporate in these articles material from Mr. McDivitt's recent report to the Association on the same subject

provide the type of information and interpretation envisaged in the " Mineral Statistics and Information Bureau ", but only with the setting up of a special branch for mineral work, staffed in part at least by men with a knowledge and understanding of problems of mineral development and supply. The Board of Trade could set up such a branch if this were within its terms of reference, but in most countries where mineral conciousness exists, bringing with it a recognition of the unique characteristics of minerals, the mineral statistics branch is separate from the main government statistical bureau.

Here, there may be immediate objection, on the grounds that we are not a mineral producing country. To this there must be a triple answer ; first, we do have mineral resources, however limited, and if we had a properly evaluated mineral policy we might find that we could and should produce much more locally than we do ; second, we are an important mineral consumer, and thus we rely to a considerable extent on imported mineral raw materials which we should know much about ; third, our mineral purchases have an effect on the economy of many areas which we should understand and allow for in our official thinking.

The men who deal with mineral statistics and problems at the Board of Trade are commodity men, not mineral men. They may work for a few years on minerals then go on to something like coconut fibre. Within the framework of their organization this is as it must be, but it hardly makes for a good continuing appraisal of the unique problems of the mineral world.

Yet, today, the Board of Trade, because it is the main source, must be called upon by the government to provide answers to questions on national and international mineral problems and situations on which it can give only a very limited interpretation. On these questions other nations are able to rely on much more detailed and specialized appraisals.

Mineral Resources Division of the Overseas Geological Survey

In the field of mineral statistics we also have the Mineral Resources Division of the Overseas Geological Survey, which as the Mineral Resources Division of the old Imperial (now Commonwealth) Institute,used to be one of the important producers of world statistics. The Division still publishes valuable information, still has a group of trained mineral statisticians, and technically trained mineral commodity analysts, and perhaps more important still has the contacts and facilities for gathering and interpreting statistics on a world-wide basis.

In its present location under the Colonial Office, to which it would appear to have been attached as an expedient in 1949 when funds at the Imperial Institute were no longer adequate to carry all the operations of the Institute, the scope of the Division is quite restricted. As a part of the Overseas Geological Survey, the Division is mainly concerned with colonial development, and all work must be related to colonial development. It can be shown that world statistics on production and consumption meet this test, but still must always be a restraining factor. Here is the section of the government which in facilities and organization most closely approximates the " mineral statistics bureau " of other governments (in the U.S. the Bureau of Mines, in Canada the Mineral Resources Division, in Australia the Mineral Economics Section, in France the Bureau of Mineral Documentation), but its main operations are in an area — the colonies — where scope is becoming progressively less, which cannot be too good for morale.

The D.S.I.R.

There is a limited amount of interpretation done on mineral statistics in other government branches (for example, in the Economics Section of D.S.I.R. headquarters, and perhaps at the Warren Spring Laboratory), but this is a reflection at the recognition of the need for such work, and the lack of any central organization which could handle it. Such piece-meal work must lead to a good deal of duplication and a good deal of wasted time and effort on the part of small groups, working individually, who would work more efficiently and effectively if they were co-ordinated. In Germany, for example, the institute in which mineral statistics are analysed includes mining men, economists, statisticians, transportation experts, etc.

The Commonwealth Economic Committee

The Commonwealth Economic Committee, a body supported by all Commonwealth members, has done some work in the mineral field, notably in its two volume study " A Review of Commonwealth Raw Materials ", released in April, 1958, and February, 1960. This group also is somewhat restricted by its terms of reference, and has no very clear place in the picture, but this very vagueness can add to the confusion. In 1956, when a Member of Parliament suggested " a Paley Report for our quarter of the globe " the government reply stated " we are now awaiting the present study of that (Commonwealth Economic) Committee. Obviously, I cannot anticipate what will be in the Report, but it is a body which seems to go at least a fair distance towards that for which the Hon. Gentleman has been asking ". The Committee of course, never proposed to cover such a field, and with its limited facilities can do little more than compile and publish Commonwealth statistics sometime after they have been received. However, here is another group working in this field, which would be affected by a co-ordinated policy.

British Bureau of Non-Ferrous Metal Statistics

Outside of the government, but working in co-operation with the Board of Trade, we have the British Bureau of Non-Ferrous Metal Statistics, which publishes relatively complete and current statistics on the non-ferrous metals. The Bureau is supported by a number of mineral industry associations, mainly concerned with copper, and mainly concerned with consumption rather than supply.

This is the most active organization in the area of non-ferrous mineral statistics, and has set up a pattern of gathering information from original sources which is unique in this field. The Bureau's monthly statistical bulletin does not

contain any interpretation or analysis of the statistics, but it is assumed that such analysis does take place. Here we must raise the question : Do producers and consumers prefer to give details of their operations to a private group such as this rather than to a government body? There is something to be said on both sides, but in balance perhaps they do.

Need for Co-ordination

This then is what we have, and these are the groups on which the government must rely for considered information when questions relating to minerals arise These groups may have enough facilities, staff, contacts even raw statistics, but with the present organization and terms of reference they cannot begin to provide the information and guidance we would hope for from a " mineral statistics and information bureau ". As often happens in a bureaucracy, it would not take much shuffling to come up with an adequate, and given proper leadership perhaps even an excellent, bureau from what we have, but the initiative must come from above.

RESEARCH AND TRAINING

Since the 1955 Symposium, the Warren Spring Laboratory has come into operation, and for the present at least is giving some emphasis to mineral processing projects. Thus, this aspect of mineral resources policy, which was discussed in detail at the Symposium is getting some attention, and such attention in one area may lead to improvement in co-ordination in other areas of research, if only by emphasizing the shortcomings by contrast.

The problems involved in training men for the mineral industry are beyond the scope of this article. Education is a highly specialized field, slow to change, and treasuring its freedom. Perhaps it can best be influenced by a sound long-term mineral policy which would provide information on which to base such things as recruitment, scholarship allocation, programme changes, etc.

FINANCE

It has been one of our assumptions that there will be no shortage of mineral reserves, and at times there will be periods of over-production from these reserves. It is also generally assumed that there will be a steady rise in the consumption of minerals which will require the expansion of existing mines, and the development of new deposits all over the world.

Friedensburg* has calculated that it requires an average of $3 investment for each $1 of new annual production, and that if we take an average figure of 5 per cent for increased annual consumption, we will need to find some $6 billion each year for new production alone. These calculations include oil, are for the whole world, and are in addition to what is necessary to cover depreciation in older mines.

Some of this money is created by the industry itself, but much must come from new investment. The picture in the future is rather complicated. These vast sums must be found to invest in an industry which, although admittedly growing, is always a high risk industry, and this normal high risk is compounded by rather extreme price (and profit) fluctuations and occasional periods of over supply, since market and supply are not co-ordinated. As a further complication, much of the new investment will be in areas which are politically and economically inexperienced, and thus relatively unstable. Under these conditions, and with so many more attractive ways to invest money, the financing of the mineral industry will be a problem.

Once more, in order to understand the nature and magnitude of the problem we must have accurate statistics, intelligently analysed. Although this is an area traditionally reserved for private enterprise even the largest companies do not have all the facts on which a nation's long-range supply should be based, nor do companies have any responsibility for this field of thinking.

At present the British Government does very little in the field of mining finance. The Colonial Development Corporation supports a few mining projects, but here, as in the case of the Overseas Geological Survey, activities are concentrated in the colonies, so this must be a diminishing rather than an expanding programme.

In some cases financing of mineral resources development, to assure long-range supply, overlaps into the realm of foreign aid. The important part that mineral development can play in the economic development of new countries, coupled with the world's long-range need for such minerals, make this a likely and rewarding area for such aid. However, the funds available to the mining industry for loans and investment of this type do not approach the amount needed. The World Bank has less than $500,000,000 a year, little of which will be alloted to mining projects, and the new International Development Association, which with its lower interest rates and more generous terms which might better fit the needs of mineral development, also will have limited funds.

To make possible additional development, some governments enter into bi-lateral agreements. Russia, for example, can make long-term loans at a low rate of interest, repayable in some cases in commodities. The United States also has extensive loan programmes. However, government money under any terms is not enough to meet the need. There is no shortage of investment funds, as evidenced by the continuing heavy public investment in private companies in the U.S., Canada, and Western Europe, but this money would not be invested in under-developed areas at normal interest rates. Germany (and perhaps other countries) has a system of underwriting work done by its private companies in areas where there are abnormal business risks, which allows German companies to finance projects on much more favourable terms than they could offer by themsleves. Under such conditions there is no shortage of private capital. Such policy has a double effect : first, it makes development possible, second, it gives the companies a financial advantage over competing companies from other nations. The total effect must be considered good, but it would be better if such a programme were international rather than bi-lateral, with an international group underwriting abnormal risks, while private companies of all nations supplied the bulk of the capital. At present Britain has no identifiable policy in these matters.

WHAT IT ALL AMOUNTS TO

This then is what we have : statistics — a number of unco-ordinated groups with no objectives in the field of policy ; research — a start towards what is considered necessary ; training — quality but no quantity, and not enough information on which to base a programme ; finance — the possibility of much difficulty in the future, but again little information on which to base a programme.

As was true in 1955, the problem centres around the need for a " mineral resources advisory board, " supported by a permanent " mineral statistics and information bureau ". Considering what we have, this would not be difficult to achieve, and considering our relationship to the mineral world, it would seem wise for us to have it. The concluding article will examine how the problem might be tackled.

* See *M.J.* of July 18, 1958.

ADVANCES IN EXPLOSIVES MANUFACTURE

A monograph entitled "Modern Explosives" (pp. 63) has been issued by the Royal Institute of Chemistry (Lectures, Monographs and Reports, 1959, No. 5). The author is the late Wilfrid Taylor, M.Sc., Ph.D, who was Joint Deputy Research Manager in the Nobel Division of Imperial Chemical Industries

IN Great Britain, the coal mining industry continues to be the largest user of explosives ; 25,312 tons of explosives were used for this purpose in 1955, involving the firing of 99,400,000 shots. The regular employment of such a vast amount of shot firing in mines where the presence of firedamp constitutes an explosion risk has not been achieved without much scientific research and development work. As a result special types of explosives have been evolved, and their safety has been confirmed by long experience.

Problems in the Elimination of Explosives

Notwithstanding the advances made in safety, there has been a body of opinion in mining circles that the use of explosives underground is always hazardous and that on occasions, admittedly extremely rare, gas may be ignited and initiate a coal dust explosion. The elimination of explosives and their replacement by mechanical means of coal mining has therefore been advocated. The position is complicated by productivity requirements and practical mining considerations. Explosives are very flexible in their operation, and it is not easy to replace their concentrated power in the driving and enlargement of tunnels in rock. On the other hand, productivity is restricted by the confinement of blasting in coal to a single shot at a time, and for this reason alone an improvement on existing explosives practice has been sought.

It is possible that a new technique may meet this requirement, namely the introduction of short (or "millisecond") delay detonators. These are electric detonators, each containing a chemical internal combustion delay element ; the detonators may be connected in series and are fired by a single operation of the exploder machine, but, in consequence of the delays, they fire in sequence, with approximately 25 milliseconds between each detonator. This interval is too short for firedamp to be released in time to constitute a hazard for the later shots in the series, and, furthermore, the shock waves from the various shots are not additive, and do not bring undue stresses on the roof. On the whole, therefore, there is a gain in overall safety in using delays, and the possibility also of increased productivity.

There is a risk, however, that one of the shots may open up a gas-filled fissure into which the next shot may fire and cause an ignition. The ignition of gas in breaks has, therefore, become of the greatest interest, and new experimental tests have been designed in Germany and Great Britain to study ignition in these circumstances. Preliminary results indicate that the ignition risk is increased when the gas mixture is confined in a narrow space.

This in turn has led to intensified work on the possibility of designing explosives of sufficiently low incendiveness to cause no ignitions even under these stringent circumstances. In Britain examination of the explosive properties of gas mixtures has shown that the effective temperature for flame propagation seems to be about 1,400 deg. C., whatever the ignition temperatures of the mixtures. If an inorganic dust is present in suspension and is of sufficiently small particle size to permit heat transfer from gas to dust, then the gas temperature can be reduced below 1,400 deg. C., and the flame should be quenched. Other British workers have shown that the quenching action of fine suspended dusts depends on the chemical nature of the dust and its total surface area per unit volume of gas. With this guiding principle and solution of the technical problem of incorporating such fine sodium dust in the explosive, compositions of exceptional safety in gallery tests were evolved. The testing of such compositions is still at an early stage, but the principle appears to have been established without doubt. Since these explosives are also characterised by a heaving rather than a shattering action the possibility of obtaining a higher porportion of "large" coal may also be attractive.

In Germany, work has taken a rather different direction. It was observed many years ago that, if a mixture of ammonium chloride and sodium nitrate is included in the explosive, reaction takes place on detonation and sodium chloride is liberated in a very finely divided condition. In recent years this principle has been applied to the design of ultra-safe explosives.

Interest in coal mining explosives was never so great as at present, states the monograph, and with the realization of the ignition hazards introduced by power equipment and electric supply at the coal face, explosives techniques for coal winning are today attracting renewed attention.

One of the most interesting new techniques in coal blasting is pulsed infusion shotfiring, which combines the use of water infusion and explosives. A charge of explosive suitably primed is inserted into the shothole and, instead of stemming, high-pressure water is applied by means of an infusion tube. While this pressure is maintained the shot is fired. The advantages are threefold—efficient transmission of explosive energy, high degree of dust suppression, and complete safety from ignitions of gas, since the explosive charge is completely surrounded by water.

Aspects of Seismic Prospecting

Seismic prospecting has proved most valuable in searching large areas for petroleum deposits. The explosive charge is detonated at some depth below the surface, and the times of arrival of the sound waves are recorded by means of sound detectors or geophones located on a fixed network some distance away.

The explosives used in seismic prospecting have to meet many difficult conditions. In addition to being able to withstand the rigours of climate they must be capable of detonating under a considerable head of water, since they are often fired in very deep boreholes. All gelatinous explosives are capable of withstanding hydrostatic pressures to a varying degree, but most of them will not propagate with any regularity if the hydrostatic pressure exceeds a certain value, which depends on the nitrogen content. In recent years explosives capable of propagating under pressures equivalent to a depth of 2,750 ft. of water have been designed. In order to achieve this performance certain very finely divided inert dense materials, which are readily wetted with nitroglycerine, are incorporated in the explosives, fine barytes being the material found to be most efficient for this purpose.

In addition, ammonium nitrate explosives packed in hermetically sealed metal canisters have been developed as seismic explosives. They depend on the strength and waterproofness of the canisters for their ability to propagate under hydrostatic pressures.

Machinery and Equipment

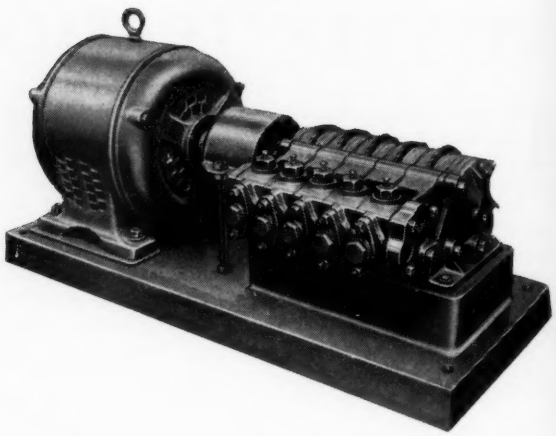
Dust Control Unit

A new dust collector of advanced design — the Unimaster — is now available from Dallow Lambert & Co. Ltd. The collector embodies many new improvements and is the successor to the Dallow Lambert Dustmaster collector which has been applied to thousands of process dust problems in many industries throughout the world. The Unimaster, particularly applicable to milling, drilling and mechanical handling operations, is a completely self-contained collector incorporating the very latest developments in dust control technique and embodying several interesting features. These include a new standard in compactness of design giving greater filtration area per floor space required; built-in fan of more efficient design with increased fan capacity and duties; improved fabric filter element of patent design, with a variety of fabric materials available to suit the dust being handled; efficient motorized "air cushion" filter cleaner with push button control for fan and filter cleaning mechanism; simplified quick release sealing gear for easy removal of dust container; alternative sizes of dust containers, quickly and easily emptied flush fitting, easy access inspection doors to fan, motor and filter; and dust inlet connection openings available on three sides of collector with one inlet spigot supplied as standard.

In the Unimaster almost every type of dust produced by the widest possible range of machines and processes can be effectively controlled. This flexibility of application, a feature of the Dustmaster and retained in the Unimaster, is made possible by the fact that the Unimaster can be supplied with a variation of fans and motors, filters and dust containers. Applications requiring a large air volume but producing little dust, can be dealt with just as effectively as those in which the air requirement is small and the dust load heavy. Light bulky dusts can be handled as easily as heavy concentrated dusts.

The new collector is initially available in the 70 series (70 sq. ft. of filter cloth area), fan capacity range 0 c.f.m. at 6.2″ water gauge to 765 c.f.m. at 3.3″ water gauge.

The Dallow Lambert Unimaster dust control unit



The Evans High-Speed Hydraulic Pump

PUMP DEVELOPMENTS

A new development in the design of high speed hydraulic pumps is announced by Joseph Evans and Sons (Wolverhampton) Ltd., to fulfil the requirements of mining and general engineers who need a high pressure pump of very small capacity. The pump is of unit construction and is available with from 3 to 6 cylinders. Each cylinder has an output of 0.6 imperial gallons per minute and a six cylinder unit would have an output of 3.6 imperial gallons per minute. Delivery pressure is 1,000 lbs. per square inch.

The eccentric shaft of the pump, which is mounted on roller bearings, is coupled directly to the motor, which runs at a synchronous speed of 1,000 r.p.m. through a flexible coupling.

The pumps are suitable for operation with water, water/soluble oil mixture or hydraulic oil as the working medium and the design can be adapted for use with other liquids. The units can be provided with spring load relief valves, or alternatively with automatic unloading valves which enables them to run light when operating against closed stop valves.

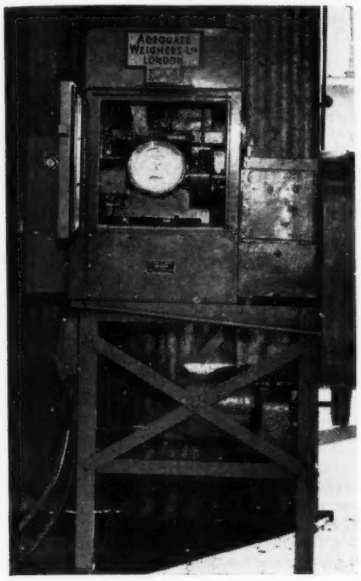
The company celebrates its 150th anniversary with the introduction of a new worm driven hydraulic pump which has many features likely to appeal to the mining, hydraulic and mechanical engineer. To be known as the 853W/M, the new pump, which has low plunger speeds, is of compact all steel construction. Designed to occupy a minimum of space, its dimensions are:—Length—5ft., Width—1 ft. 10 ins., Height (ex-motor)—1 ft. 8 ins. The pump unit is a 1½ in. by 2 in. horizontal triplex ram pump.

INTERMITTENT GROSS WEIGHER

The Adequate intermittent gross weigher has been designed to provide a fully automatic instrument which will record the weight of material carried over a system of aerial ropeway conveyors. The machine does not require any attendant operator, nor does it halt the flow of containers at any stage.

The machine comprises a lever system with a pendulum resistant, a pendulum clamping device and is manufactured by Adequate Weighers Ltd. The integrator incorporates a special gear mechanism to isolate the totaliser when required. The sequence of operation is generally that a skip carriage moves on to the weigh rail, which is suspended from two robustly constructed tubular levers. The load applied to the weigh rail is transmitted by the two power arms to a further single lever projecting at right angles. The applied load on this lever is in turn transmitted to a connecting rod which transfers the load to a further lever system incorporated with the recording mechanism, which is normally situated at ground level. The resultant force of this final lever system is applied to the pendulum resistant.

As in standard Adequate conveyor weighing machines, the pendulum carries a fork which controls the lateral movement of the steel ball drive in the integrating mechanism. As soon as a skip is fully on the weigh rail, it trips a switch which first releases the clamping mechanism on the pendulum and allows the pendulum to adjust itself to the weight of the skip, and then starts a time relay mechanism. Before the skip moves off the weigh rail, the time relay mechanism operates the clamping mechanism to hold the pendulum at the position indicating the weight of the skip. A fraction of a second later, it starts the recording cycle.



The Adequate Intermittent Gross Weigher

Whilst the special gear mechanism disengages the totaliser as soon as the weight is registered, the pendulum resistant remains held firm at the position indicated by the last weight until the next skip releases the mechanism. Thus the lever system has only to adjust itself to the change in weight of successive skips and does not have to move from zero to load each time. Although the machine is primarily a gross weigher, the mechanism can, of course, be arranged in such a manner to allow for the tare of empty skips.

ROLLING STOCK NEWS

The new B.S. 3237: 1960 provides for the design and construction of good quality light and medium rolling stock of up to 60 cu.ft capacity. The vehicles are of the pit tub type. They are primarily intended for haulage elsewhere than in collieries. (It is intended to produce later a similar standard for the heavier mine car).

Although B.S. 3237 deals with the complete vehicle, care has been taken to avoid restriction on design. Materials and basic requirements for design and construction are specified for bodies and underframes; but for such components as wheels, axles and pedestals and the drawgear hook, the specification goes into greater detail. The range of sizes of fixed and loose wheels has been greatly reduced as compared with present practice.

A grab which completely obviates hand-trimming when used to unload railway wagons has been designed and is now being manufactured by Michael and Partners Ltd. First developed for use on the company's own civil engineering operations, this self-trimming grab proved so successful that the company decided to manufacture it for sale with capacities of up to 3 cu. yd.

The 1½ cu. yd. model has been specifically designed for unloading standard steel wagons.

Equipment Digest

The latest leaflet from Union Fibre Pipes (Great Britain) Ltd., shows that numerous additions have been made to their range of existing fittings. Completely new designs include 4 in. dia. medium radius bends, double junctions to give two 4 in. outlets from 6 in. or 4 in. mains, a saddle providing a 4 in. pitch fibre outlet from 6 in. earthenware, and a raising piece for use with gullies.

There is also a wider range of sizes and angles for knuckle bends and equal junctions, while the adaptors and sleeves for joining pitch fibre to stoneware or cast iron have been re-designed. Copies of the new leaflet are obtainable from the U.A.M. Group Advisory Service, Tolpits, Watford, Herts. (Watford 34551).

★

To meet the demand for a robust medium sized dumper to work in conjunction with the modern tractor-mounted hydraulic excavators, a dumper of 2 cu. yd. heaped capacity has been developed by C. H. Johnson (Machinery) Ltd. Self-tipping and self-returning, with a clean discharge, the skip is of robust reinforced design, 7 ft. 8 in. wide, and with a front loading height of 3 ft. 9 in., for easy loading by power shovel or digger. Twin driving wheels can be fitted to assist the dumper to negotiate the soft ground conditions often associated with excavating operations.

This dumper is based on the Johnson Twin/Sixty-five dumper, and this development has been made possible by the extremely robust construction of the standard Johnson dumper chassis. The power unit is the Petter AVA.2T air-cooled diesel.

★

The design of a compact mixer settler unit which is used in the solvent extraction process at many new uranium mills is discussed in *Design Study Bulletin No. M7-F65* recently released by Denver Equipment Co. The mixer settler unit, based on a unit designed for Mines Development, Inc., Susquehanna-Western, Inc. and the Gunnison Mining Co. is illustrated in both plan and profile views.

★

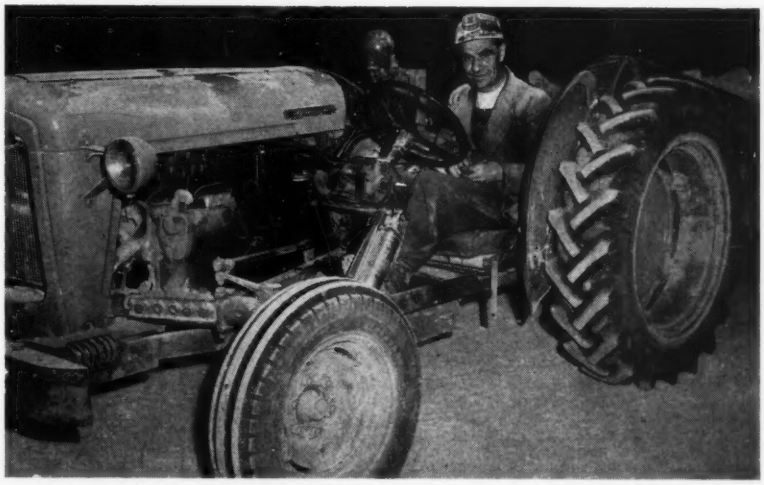
A new range of totally-enclosed, fan-cooled, squirrel-cage motors with Class E insulation and complying with Draft B.S. A(ELE) 1,629 has been introduced by The General Electric Co. Ltd. Motors of up to 7½ h.p. at 1,500 r.p.m., and 5 h.p. at 1,000 r.p.m., are immediately available from stock; sizes up to 40 h.p. will be available shortly.

These "D" frame machines have a continuous maximum rating in accordance with B.S.2,613 for temperature rise of 65°C in ambient temperatures up to 40°C. They are interchangeable with ventilated machines ("C" frames) of the same rating complying with B.S. 2,960.

★

Description of the Manvers Central coal preparation plant is described in an Engineering Notebook Bulletin just released by Denver Equipment Co. The Bulletin, No. M4-B100, describes the 40-ton per hr. flotation of coal at 10 per cent solids.

200 ft. underground six Massey-Ferguson tractors are working in a Nottinghamshire gypsum mine. Producing 200,000 tons annually, the mine is at East Leake, near Loughborough. Marblaegis Ltd., the owners, are a subsidiary of the British Plasterboard Holdings. Because the roof of the mine is only 6 ft. high — and in some places as low as 4 ft. 6 in.—the tractors have been modified to lower the seating position. An average man sitting in the seat of a 35 would need about 6 ft. 6 in. headroom. On the modified 35's it is possible for the tractors to go anywhere in the mine. The steering column has been moved over to the left and the driver is now sitting just in front of and level with the rear axle on the left hand side of the tractor. His head is just above the level of the bonnet. Each of the six converted tractors working in the mine has been fitted with a catalytic exhaust system which reduces the amount of carbon monoxide in the exhaust fumes and other irritating material, thereby conforming with mining regulations



MINING MISCELLANY

The gold reserves in the Dead Sea area of Baramia, in Egypt are to be worked by a semi-State concern, according to U.A.R. sources. The concession previously held by a non-Egyptian firm has now expired, and production is expected to be increased to 1 kg. per day.

★

Hard coal production in Czechoslovakia by 1965 is estimated at an annual tonnage of 35,500,000, 20 per cent higher than that for 1960. Expansion will take place exclusively in the Ostrava coalfields, where coking coal—much of it exported to other Communist-satellite states—is mined. While the output of other areas will not be increased during the period, the production of Ostrava hard coal will rise by 85 per cent in total Czech output. Czech brown coal installations are at present working well below their recently increased capacities, and 1960 output is planned at 53,400,000 tonnes, the same as 1959. The surplus brown coal produced in 1960 is to be used in power plants.

★

According to a statement issued by the U.S. Department of Commerce in Washington, an estimated $1,004,000,000 is to be spent on mining investment over the current year, some 2 per cent more than the 1959 sum of $987,000,000. The American iron and steel industry is expected to spend half as much again on investments than in 1959, and the stone, clay and glass industries about one-third more. In the first two quarters of 1960, it is estimated that some $214,000,000 and $260,000,000 respectively will be spent on mining investment, $308,000,000 and $424,000,000 on primary iron and steel, $75,000,000 and $79,000,000 on primary non-ferrous metals and $146,000,000 and $153,000,000 on stone, clay and glass products.

★

Of the 35,500,000,000 drachmae to be invested by the Greek Government during the 5-year plan covering the period 1960-1964, some 6,200,000,000 drachmae will be invested in industry and brown coal mining, according to an announcement from Athens. In addition to government investments over the period covered by the plan, a further 74,000,000,000 drachmae will be invested privately, some 56,500,000,000 drachmae of this sum being provided by Greek enterprises.

★

According to a report issued by the Economic Commission for Europe, demand for coal in the second quarter of 1960 will be higher by 5 per cent than that for the same period of 1959. The report anticipates a continuation of short-time working in some members of the European Coal and Steel Community, but states that this will not be so great as during the corresponding period last year.

★

Czechoslovakia plans to increase uranium ore production by 24 per cent by 1965, by exploration schemes, and reorganization of existing plants to build up processing capacity. In the 1956-1960 period, output is estimated to have increased by 33 per cent.

The Kanak-Achinsk area in Russian central Asia is scheduled to become one of the most important coal centres in the Soviet Union, according to the Soviet News Agency *Tass*. It is estimated that in 20 years 230,000,000 tonnes of brown coal, or one-half of the present total national output, is to be produced in the region annually. Power plants reputed to be the biggest in the world are to be erected in the area and fed with this coal, while the mining equipment, it is claimed, will include coal excavators capable of handling 5,000 or even 10,000 tonnes per hour.

★

A deposit of rich silver veins over an area of 18 hectares is reported to have been discovered in the Spanish province of Guadalajara, where silver exploitation had ceased and the mines been closed as production had become uneconomic. Exploitation with modern equipment is now to be resumed.

★

The German ore expert, Dr. Hermann Noeth, of the Salzgitter concern, is reported to be making a study of manganese, lead and copper deposits in the Mendoza province of the Argentine. It is believed that the Mendoza mining interests hope for German financial backing in exploiting these deposits.

★

Rich brown coal deposits are reported as discovered at Seyitomer, Turkey, between the towns of Kutahya and Tavsanli. It is stated that the seams are capable of yielding between 800,000 and 1,000,000 tonnes annually.

The iron ore deposits at Beaconsfield and Blythe River, Tasmania, are to be investigated. At present the Government of Tasmania is concentrating its investigations into the iron ore potentials of the State on the Savage River area of the West Coast. It is hoped that these deposits may form the foundation of an indigenous steel industry. Testing of the Savage River deposits by drilling and by overseas furnace checks is first necessary and the mining of iron ore for export in Tasmania will not be permitted until the results are known.

★

New terms for the investment of foreign capital in Chile are now in force. Under a decree passed recently capital of foreign concerns, or of those established by them in Chile, can enter the country either as foreign currency or properly qualified credits, or in the form of machinery or equipment considered necessary to aid productivity and the national economy. The decree stipulates that all imports of new machinery for the establishment of industries not already existing in the country, and which consume at least 80 per cent domestic raw material, can be freed from customs duty and all other customs expenses and taxes such as consular fees. The same privileges can be granted to industries exclusively devoted to the production of export goods. Similar privileges will also be enjoyed by industries forced to sell part of their output in the country to comply with legal terms or to cover national requirements in an emergency. The decree adds that if any imported goods are removed from the country, all the relevant duties and taxes must first be paid unless the authorities grant exemption.

New nesting shape of aluminium pig developed by Kaiser Aluminium and Chemical Corporation, assures that bundles will survive the roughest transit and arrive intact. The new shape permits stacking into tight, square bundles. Each bundle is secured by two 1¼-in. high tensile steel bands and wrapped in polyethylene bags

To handle the growing exports of iron ore, manganese ores and smaller quantities of zinc concentrates now being shipped through the port of Lobito, Portuguese West Africa, a modern handling plant has recently been installed there by the British firm of Spencer (Melksham) Ltd. Capable of handling 400 tons an hour, the new Lobito installation has been built as a part of the long-term development of the port, and will increase handling capacity from 2,000,000 tonnes to approximately 3,500,000 tonnes a year. Illustration shows the outloader in operation

The coal washery at Durgapur Steelworks, India, has commenced operations. Capacity is 360 t.p.h. Raw coal above ½ in. size is treated in the dense medium section of the plant, which uses a finely ground suspension of magnetite ore in water. The raw coal below ½ in. passes to a feldspar jig. Raw coal from the Jharia field is crushed to 3 in. and conveyed to the washery via a 100 ton balance bunker. Coal washing is in accordance with the most recent British practice, but design of the washery has been evolved to suit Indian conditions. The washery was designed and built by Simon-Carves Ltd. The company also trained the key Indian operators of Hindustan Steel Ltd.

*

Following the visit to Thailand earlier this year of a West German industrial mission, the Thai Government has now issued a list of the most important industrial developments that it is hoped will be carried out in the country. These developments include the exploitation of brown coal deposits in the Krabi area of southern Thailand, and the construction of a large power station that will be operated with brown coal as fuel.

*

Reports from Khartoum indicate that a "battle" is taking place for the right to exploit Sudanese iron ore deposits. Protagonists are Fiat of Italy, Krupps of Federal Germany, and an as yet unnamed Czech body. Total worth of the Kordofan ores is placed at £150,000,000

*

An accurate model, 5 ft. square, will show visitors to the North Staffordshire Golden Jubilee Industrial Exhibition at Stoke-on-Trent, May 18—June 4, 1960, how cryolite is mined in Greenland. The model was constructed by the Danish principals of J. G. Gregory and Son Ltd.

Mexico's total mineral exports during 1959 resulted in a revenue of $U.S.219,000,000 ($U.S.199,000,000 in 1958), the principal customers being the United States, Federal Germany, Japan, Holland, Belgium, Canada and the U.K. Actual exports, with the figures for 1958 shown in parenthesis, were (in tonnes); manganese 76,953 (78,357), copper 40,607 (40,281), arsenic 6,477 (1,738), antimony 2,500 (1,878), silver 1,210 (1,131), mercury 720 (902), cadmium 475 (700), tin 98 (33), bismuth 97 (141), gold 1,384 (1,382) kg.

*

Tass reports that a 20-year plan for mineral exploration has been worked out by the Russian Ministry of Geology and Raw Materials. A recent communiqué states that in future it will be possible to establish a ferrous metals industry in all parts of the Soviet Union by employing iron ore from the rich deposits in southern Yakutia and in Mongolia.

*

A total of 10,000,000 tonnes of Swedish iron ore were shipped from Narvick last year.

*

The Federal Government of the Central African Federation is to carry on investigations into the oil from coal scheme, although it does not intend to finance such a scheme. This information was released by the Minister of Commerce and Industry in reply to a question in the Federal Assembly on April 11. The report of the Anglo American Corporation of South Africa has been made available, reaching the decision that in view of the formidable difficulties in establishing an economic plant, the project is not at present feasible. The Federal Government has decided that further study should be made of certain aspects of the difficulties to see if the economics of the scheme could be improved.

Bulgaria is engaged in expanding its heavy industry on the basis of recent ore finds, according to a recent communiqué. At Kremikovsti, near Sofia, a ferrous metal plant is being built and will come into operation in 1964. It is planned to use the ores of the Rhodope region. Initial capacity will be 300,000 tonnes annually of pig iron, 450,000 tonnes raw steel and 300,000 tonnes rolled steel. In the following year a second blast furnace will be installed at the same site to raise pig iron production to some 1,000,000 tonnes a year. The Lenin combine near Sofia at present produces some 65,000 tonnes pig iron annually as well as 160,000 tonnes raw steel and 117,000 tonnes rolled steel. In the non-ferrous field the Kurdjali lead and zinc plant will soon have doubled its 1957 capacity of 7,000 tonnes a year zinc, 12,000 tonnes lead and 11,000 tonnes a year of sulphuric acid. A further lead-zinc plant under construction will be able to produce 30,000 tonnes of zinc a year. The Pirdop copper refinery built two years ago is to expand production and by 1962 Bulgaria is planning an annual output of 45,000 tonnes lead and 17,000 tonnes electrolytic copper. Three years later annual production is planned at 90,000 tonnes lead, 50,000 tonnes zinc, and 25,000 tonnes electrolytic copper.

*

Earlier this month J. A. Maloney, Ontario's Minister of Mines, signed an exploratory licence of occupation giving the Moosonee Gypsum Exploration Co. Ltd., exclusive rights for three years to explore and develop deposits of gypsum, anhydrite and calcium sulphate in an area of about 384 sq. miles in the James Bay Lowlands.

*

Plans are being completed for a Japanese organization to co-operate with an Australian company in developing the rich Kianga coalfield in Queensland. The Mitsui Mining Co. and associated firms in Japan hope to form a new mining company with the Australian civil engineering firm of Thiess Brothers. The agreement is now said to be awaiting the formal approval of the Japanese and Australian authorities. Earlier plans announced for the development of the Kianga field provide for a railway line of 100 miles to the port of Gladstone. The Mitsui Co. has already placed firm orders for coal from the Kianga field, where the coal deposits are estimated at 1,000,000,000 tons. The Thiess Co. says the orders amount to 1,000,000 tons in 1961 rising to 3,000,000 tons a year by 1964. At present, Japan imports 700,000 tons of Australian coal per year, mainly from New South Wales.

*

Under a 5-year trade agreement (1961-1965) signed in Budapest between Hungary and Eastern Germany, Hungary will supply the East Germans with mine installations, receiving in return mined products.

*

According to the Annual Report of the Banco de Mexico on Mexico's production during 1959, the mining industry showed an increase of 2 per cent over 1958.

(Continued overleaf)

MINING MISCELLANY—Continued

Dr. Hans Schauman, Krupp representative in Latin America, is of the opinion that the Mexican mining industry should be expanded in the centre and towards the south of the country and not remain concentrated in the north. Dr. Schauman feels that this expansion will make it possible to utilize rich natural deposts, thus creating new production areas.

*

Venezuela's diamond production last year amounted to nearly 95,000 cts. of which 69,673 cts. were industrial stones, 15,104 cts. were gem stones, and the remaining 10,209 cts. were boarts. Exports totalling $U.S.1,200,000 represented about 87 per cent of total production.

*

The Indian Minister of Steel, Mines and Fuel, Sardar Swaran Singh, has stated that further investigations have revealed the existence of an additional deposit of 8,000,000 tons of lignite in the Palana area in Rajasthan. According to original estimates the deposit in that area was 10,000,000 tons.

*

According to a report by the Secretary General of the U.N. on permanent sovereignity over natural wealth and resources, direct U.S. investments in Latin American mines and oil exploitation totalled $U.S. 4,358,000,000 at the end of 1958. This is about half the total U.S. investment in Latin America.

*

The Whim Creek mine, 50 miles east of Roebourne, Western Australia, and a cluster of 26 small mines at Clonclurry, Queensland, are being considered by Japanese interests as possible sources of raw copper.

*

Under a new development scheme costing £32,500,000, Appleby-Frodingham Steel Co. plans to increase its productive capacity for iron and steel and to install a new rod-bar mill, and Samuel Fox and Co. Ltd. is to add 100,000 tons per annum to its steel making capacity. Both works are branches of the The United Steel Companies Ltd. These major projects, scheduled for completion by the autumn of 1964, represent the largest development scheme ever to be undertaken by the company. Iron and Steel Board approval has been given. When completed, together with other schemes already in hand, the ingot capacity of United Steel will be raised from its present level of about 3,000,000 tons to approximately 4,000,000 tons per annum. The introduction of additional plant to produce finished products to the extent of a minimum of 300,000 tons per annum will call for increases in output as far back in the production sequence as the initial raw materials. Thus United Steel's Ore Mining Branch plans to increase the level of its ironstone extraction from 6,190,000 tons per annum to 7,700,000 t.p.a. All this additional ironstone will be extracted from the company's ore fields in north and south Lincolnshire and Rutland.

Metals and Minerals

Bauxite Production in 1959

According to the Bureau of Mines, U.S. Department of the Interior, world production of bauxite in 1959 amounted to 21,800,000 l.tons, representing an increase of approximately 5 per cent over the previous year's total of 20,370,000 tons. This improvement was achieved despite substantially lower output by some of the major producing countries, notably Jamaica and British Guaina.

Though output declined to 5,100,000 tons from 5,722,000 tons in 1958, Jamaica remained the leading producer. On the other hand, Surinam's production rose by 400,000 tons to 3,340,000 tons.

Surinam is itself to become a producer of aluminium in 1965, states Mr. H. Meijer, director of the Surinam Aluminium Co. At present almost all the country's bauxite is sold to the U.S. As a result of the $100,000,000 Brokopondo power scheme for the area, a plant could be built at Paranam, which would be in production by 1965 at an annual rate of 55,000 tonnes. In the first quarter of this year alone 873,278 tonnes of bauxite were exported from Surinam.

Over the past three years Yugoslav exports of aluminium products have tripled both in quantity and value. Out of the total exports of non-ferrous metals during this period, the share of aluminium products has increased from 4 per cent in 1957 to 68.7 per cent in 1959. Last year exports of aluminium products totalled 10,019 tonnes, as compared with 6,020 tonnes in 1958

Haiti's production increased further to 400,000 tons from 340,000 tons in 1958 and 262,946 tons in 1957, while the Dominican Republic appears for the first time in the list of producing countries with an output of 388,000 tons.

The output of the U.S.S.R., Europe's largest producer, is again estimated at around 2,700,000 tons. French production fell slightly from 1,940,000 tons in 1958 to 1,740,000 tons last year. Hungarian production was also slightly lower, but this setback is likely to be only temporary, having regard to the considerable expansion of the aluminium industry called for in the 1961-1965 Five Year Plan.

Increased demand from Japan is reflected in the higher figures for Indonesia and Malaya, which increased their outputs respectively from 338,474 to 375,474 tons and from 262,400 to 381,700 tons.

U.S. domestic production rose from 1,311,000 tons in 1958 to 1,674,000 tons last year, being an increase of about 28 per cent.

Western Australia's Minister for Mines, Mr. A. F. Griffith, has announced State Government approval of the mining and export to Japan of up to 1,250,000 tons of West Australian bauxite in the next five years. This provides Western Mining Corporation Ltd. and its associates, Western Aluminium No-Liability, with a firm basis on which to complete negotiations with Japanese aluminium producers for the export of three 10,000 tons trial shipments. If trial shipments and price negotiations are successful, exports rising to 300,000 tons yearly are regarded as possible.

*

The proposed expansion of the Bell Bay, Tasmania, aluminium works from a capacity of 12,000 tons to 16,000 tons per year depends upon provision of finance, reports our Australian correspondent. Of the two joint owners, the Tasmanian State Government is limited in the extent to which it can be committed, and the Commonwealth Government is unwilling to put more money into the venture. The possibility of introducing private enterprise into partnership has been under consideration.

It is now reported that there is a prospect of linking the works with the Weipa, Cape York, aluminium project, through British Aluminium Co. Ltd., which is a partner with Consolidated Zinc Ltd. in Comalco, the company developing the large bauxite deposit on the Peninsula. British Aluminium is stated to have taken an option over the Bell Bay works, following an examination of its technical and economic aspects. A firm offer to the Commonwealth Government for its interest is forecast. It is also predicted that production of aluminium from Weipa bauxite will be commenced at Bell Bay in 1961.

*

First quarter aluminium demand and consumption in the U.S. neither came up to the expectations nor matched the level of the previous quarter, reports the *American Metal Market*. On the basis of reliable estimates, business probably declined by as much as 5 per cent below the fourth quarter of 1959. Nevertheless producers and distributors alike remain confident that 1960 will end up 10 per cent or more above last year's levels.

G.S.A. TO SELL GRAPHITE

Plans for the disposal of 2,647 s.tons of graphite from the U.S. national stockpile have been announced by the General Services Administration. After expiration of the six-month period required by law, the agency plans to offer 740 tons on a competitive basis. Of this amount 712 s. tons are of domestic origin in the form of crystalline flakes. The remaining 28 tons are Ceylon amorphous lump graphite. The 740 tons will be offered in minimum lots of 25 tons. G.S.A. stated that the remainder of the 2,647 tons, which consists of domestic crystalline fine, presents special problems in disposal, and that it would confer with industry before offering this material.

SOVIET-WEST GERMAN MINERAL QUOTAS

Export quotas have been announced for the current year for Russian sales to West Germany. They include, compared with last year's levels, the following: residual pyrites, 100,000 (140,000) tonnes; manganese ore, 80,000 (100,000) tonnes;

chrome ore, 70,000 tonnes minimum (45,000 tonnes); asbestos, 35,000 (25,000) tonnes; pig-iron, 75,000 tonnes (unchanged); ferro-chrome, 2,500 tonnes (unchanged); ferro-silicon, 5,000 (3,500) tonnes; tungsten concentrate, 1,500 (1,200) tonnes; zinc, 6,000 (4,000) tonnes; tin, 1,500 tonnes minimum (3,000 tonnes); antimony, 2,000 (1,500) tonnes; platinum, 1,500 kg. (unchanged); palladium, 900 kg. (unchanged); mineral oil, 1,500,000 (700,000) tonnes; apatite concentrate, 180,000 (130,000) tonnes.

U.S. STOCKPILE INVENTORY

A special committee of the U.S. National Academy of Sciences has recommended a review of stockpile policies to take into account many elements which may be of increasing importance to the national security in the future. The committee was set up a year ago to find means to strengthen defence research and development on materials. As examples of elements now not on any government stockpile list, the report cited tellurium, potentially useful in thermoelectric devices, and rhenium, which has potential in high-temperature applications. Another element, tantalum, is regarded as not being stockpiled in sufficient quantity to meet its potential future use in high-temperature alloys and compounds.

The committee recommended that the Office of Civil and Defence Mobilization should annually re-evaluate the potential demand for chemical elements with a view to expanding supply programmes if necessary. Emphasis was placed in the report on the need for assurance of adequate supplies of every useful element to permit prospective users to design and specify items with the confidence that they would not be hindered by materials shortages.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

The copper and tin markets have been the main centre of interest this week and in both cases the prices have moved higher in active trading. Lead and zinc have been featureless but the undertone continues steady.

CHILEAN STRIKE FEARS

The uncertain Chilean situation remains the dominating factor as far as the copper market is concerned, where after two postponements a strike vote was taken at the beginning of the week, the result of which went overwhelmingly in favour of strike action as from May 1 at Anaconda's El Salvador mine and Potrerillos smelter when the current labour contract runs out at the end of the week. Simultaneously it was announced that direct negotiations between the company and the union would be resumed immediately in an effort to bridge the wide gap between the two parties.

Thus the situation is that unless some real progress can be made in the course of these direct negotiations by the end of the week, a strike is scheduled and appreciating the potential seriousness of any interruption of supplies which this would cause, both Continental and U.K. consumer interest has been maintained at a brisk level.

As far as the nearby price in London is concerned, U.K. official warehouse stocks declined last week by 125 tons to 1,674 tons. This decline was somewhat greater than expected and brought in some bear covering. Until such time as this trend is reversed (and this is being rendered more difficult by current U.S. export licensing formalities), a backwardation must remain which, however, will alter almost daily on technical consideration. Overall the market will remain extremely nervous with daily price movements in line with any development in the general situation.

In the U.S., domestic copper business leaves a lot to be desired and it is generally agreed that the active export market is in the main responsible for maintaining a steady tone with the price at 33 c. in line with the customs smelter and producer quotation. But for this, these supplies would be a considerable drag on the U.S. market as consumer buying for May delivery is not impressive and athough some producers claim to be well sold for that month, others still have copper available. U.S. copper fabricators' statistics issued during the week show (in s.tons):

	March, 1960	*February, 1960*
Shipments — copper content	104,857	103,072
New Orders — copper content	73,327	75,763
Refined copper received	122,752	111,851
Unfilled sales — copper content	134,461	165,991
Refined stocks held	441,026	423,131

U.S imports of copper showed a substantial fall in February at 46,713 tons compared to 62,873 tons at the end of January. Two increases have taken place in the Belgian electrolytic price during the week from B.frs. per kilo 35.75 to 36.25 to 37.00. A spokesman for Union Miniere has denied rumours current in London that there had been a major breakdown at one of the producers' furnaces in the Belgian Congo.

U.K. consumption of copper in February showed a satisfactory increase at 61,587 tons compared with 57,316 tons in January and stocks at the end of February were 55,979 tons compared with 61,088 tons a month earlier.

WHY A "BACK" IN TIN?

The tin market has seen a sharp widening of the backwardation to fully £12 per ton. Whilst contributory factors to this movement have been the steadier Eastern price and a certain amount of outside buying interest on both sides of the Atlantic, the main reason is attributed to the absence of any buffer pool selling. This situation, whereby the daily dealings are to an increasing extent dominated by the decision of the International Tin Council to buy or sell metal, has caused growing disquiet and it remains to be seen how the market will proceed in the coming weeks.

The chairman of the Council has announced that the tin held in the buffer stock at the end of December amounted to 10,050 tons compared to 14,094 tons at the end of June last year and 23,325 tons at the end of 1958. Stocks in official warehouses fell last week by 80 tons to 7,768 tons.

Consumption of tin in the U.K. for February was virtually unchanged from the previous month at 1,879 tons but the U.K. stock figure on balance was a little lower at 10,240 tons against 10,884 tons at the end of January. Shipments of tin from Penang for the first half of April amounted to 1,588½ tons compared with 3,041 tons in the first half of March, whilst Singapore shipments were 1 ton lower for the same period at 1½ tons.

On Thursday the Eastern price was equivalent to £790¾ per ton c.i.f. Europe.

LEAD AND ZINC

There have been no fresh developments in the lead and zinc markets. As far as lead is concerned, prices have inclined a little lower, whilst in zinc a slight widening in the backwardation has taken place. U.S. lead producers report satisfactory sales but zinc is only moving slowly. Imports of lead into the U.S. in February were a little lower than a month earlier whereas zinc imports were higher.

In the U.K. consumption of lead for February declined to 30,241 tons against 31,745 tons in January, whilst the zinc figures showed little change at 30,480 tons compared with 30,637 tons.

Closing prices are as follows:

	April 21 *Buyers*	*Sellers*	April 28 *Buyers*	*Sellers*
COPPER				
Cash	£268¼	£268½	£259½	£260
Three months ..	£248½	£248¾	£246½	£247
Settlement ..	£268½		£260	
Week's turnover	8,275 tons		12,650 tons	
LEAD				
Current ½ month	£77⅛	£77¼	£77⅛	£77¼
Three months ..	£76⅛	£77	£76⅛	£76½
Week's turnover	5,175 tons		9,225 tons	
TIN				
Cash	£788	£788½	£793½	£794
Three months ..	£783½	£784	£784	£784½
Settlement ..	£788½		£794	
Week's turnover	605 tons		770 tons	
ZINC				
Current ½ month	£92½	£92⅝	£94	£94⅛
Three months ..	£89½	£90	£90⅜	£91
Week's turnover	3,900 tons		7,375 tons	

London Metal and Ore Prices appear on page 499

Mining Finance

Mr. Watson on Randfontein's Future

Mr. D. A. B. Watson has a reputation for being detailed and frank in his chairman's statements. The one that has now been issued in advance of the Randfontein meeting on May 5 next is certainly no exception. It can hardly be a bright document. This western Rand mine now depends for its profits almost entirely on uranium. Its government contract for this metal runs out at the end of 1964. If there is then still a demand Mr. Watson thinks that Randfontein will be able to compete. But it would have to trim its costs.

This would have to be done by lowering the production rate and resorting to selective mining in order to increase the grade of ore mined and so reduce the cost per pound of recovering the uranium oxide. In these circumstances " a period of profitable operation might still be possible after the termination of the present contract even at reduced prices ". How long this period would be, of course, would depend on the extent to which the uranium produced could be sold and also on the availability of mine ore still payable in these circumstances.

Present evidence about the future demand for uranium seems to point fairly definitely to the fact that it is likely to be poor indeed in the second half of this decade. It is then hoped that it will pick up strongly again in the seventies as nuclear power programmes get into their stride. But Randfontein would hardly be able to wait this long. So Mr. Watson perforce has to say that if little or no demand exists for uranium after 1964 then the mine would have to be put on a care and maintenance basis or, more probably, closed down completely. In that case its chances of ever re-opening would almost certainly be remote. Presumably a start would be made on realization of the assets. These, together with the results of clean-up operations at the mine, could bring in a very substantial sum especially as there is a power station included which would quite likely be bought by the state power concern, Escom.

DIVIDEND PROSPECTS

In the meantime, Randfontein should have five more years of dividend payments before it, but not necessarily on the scale of last year's 4s. per £1 share. Mr. Watson, in fact, warns that earnings available for distribution in 1960 are likely to be " somewhat reduced " owing to an expected reduction in profit from the gold division of the company's operations; some increase in tax liability; and the start of an annual contribution towards the cost of South Africa's uranium research programme. At the same time plant renewals will mean a certain amount of capital expenditure in the next year or two. So it is advisable to maintain the company's liquid position.

In the present market malaise Randfontein have dropped to 17s. 6d. a far cry from the over 70s. levels achieved in the mid-fifties. This hardly looks to be the best moment to sell even on the most pessimistic interpretation of Mr. Watson's lengthy statement.

VITAL MONTHS FOR FREDDIES

It is certainly not a very happy time for Mr. Watson at the moment, because he has also had to deliver an annual statement concerning that struggling O.F.S. gold mine Freddies Consolidated. The next two months are likely to be vital for this concern. The main object of its existence at the moment is to get its operations on to a basis where at least no money is being lost. This will then enable it to continue in being while the last chances of finding any really economic reefs are explored. Such chances now mainly concern the Elsburg reefs in the western part of the property. But Freddies is finding it difficult to get on to an even keel profitwise. It is hoped to do so in May and June.

If this is not possible, Mr. Watson points out, it will become necessary " without further delay " to reduce the rate of development to a level that will enable operations to be continued on a break-even basis. This reduction " would almost certainly be a prelude to the ultimate closure of the mine ". Altogether, shareholders would be well advised to look this possibility squarely in the face because Mr. Watson hardly holds out much hope that the Elsburg reefs will provide worthwhile payable tonnages. " Remote " is the word he uses to describe this possibility.

If Freddies does have to close down next year there is unfortunately no big asset value to buoy up shareholders' hopes. Mr. Watson repeats last year's official estimate that only about 2s. per £1 share would likely be forthcoming from a realization of the assets. So, unless a miracle happens, the shares at 1s. 9d. look adequately valued. Any such miracle now would seem to be little other than a rise in the price of gold.

GEDULD'S COMING NEW ROLE

Another old gold mine, Geduld Proprietary, which is much nearer the end of its profitable life than City Deep, is not to give its shareholders the benefit of a distribution of its assets when it ceases to conduct mining operations. It has now been finally decided that it will continue as an investment company. Shareholders may well have mixed views about this. There has been at least one rather painful example in the past of an old mine adopting this policy and only succeeding in losing a large part of the shareholders' money. In the case of Geduld, however, there will presumably be the distinct advantage of having the benefit of Union Corporation's very great experience when planning its investment career.

Geduld starts off, of course, with its present major holding consisting of 3,308,425 stock units in the neighbouring East Geduld mine. It has also acquired holdings in the Winkelhaak, Bracken and Leslie mines of the new Kincross area together with other unspecified gold-mining and finance shares. The policy henceforth will be, it is stated, to invest all the company's surplus funds together with a portion of its annual profits. The directors are quite frank about the effect of this on dividends. It will mean that for the time being the distributions will be approximately equivalent to twice those per unit declared by East Geduld. For 1959 this would have meant payment of 7s. 4d. per Geduld share against the 9s. 9d. actually declared. Later, consideration will be given to supplementing distributions out of income from the new investments. If payments are to be anywhere near maintained this will naturally prove necessary in due course because East Geduld is also well into the waning stage of its life.

Geduld £1 shares have fallen back to 52s. 6d. On a 7s. 4d. dividend the yield would be 14 per cent before double tax relief. The verdict here is that a buyer must be prepared to have faith in Union Corporation's know-how in the sphere of investment. He must also realise that the prospect of tax-free capital returns from this old mine has now disappeared.

JO'BURG'S MARKET AND CITY DEEP

Shareholders in City Deep, the distinctly elderly Rand gold producer in the Central Mining group, should always these days, if they know their company's affairs well, read through the annual report to see what the latest pronouncement is about the projected vegetable market in Johannesburg. It is contained in the 1959 report in the following words, " the proposed sale of some 260 acres of the company's freehold to the City Council of Johannesburg for a new market site is still under consideration by various interested Government and Provincial Authorities ".

It has been so ever since March, 1956, when City Deep first announced the sale of 260 acres of their freehold to the Johannesburg City Council for approximately £360,000 equal to £1,385 an acre. Great hopes were raised at the time of a capital return by the company. The shares of other Central Rand mines went up on optimistic calculations as to their freehold value based on the City Deep sale. Now, four years after, it cannot be said that the prospect of the sale ever being completed is reflected to even the slightest extent in the price of City Deep, currently 14s. 6d. for the £1 shares. But the project cannot yet be completely written off. There is still anyway some chance that the deal will go through even though the terms may have to be adjusted.

On the original basis the sale would add 3s. 6d. per share to City Deep's net liquid assets which at December 31 last stood at an amount equal to around 11s. per share. In the period since the sale was announced the company has financed considerable capital expenditure as well as resumed the payment of dividends. The 1959 distribution was 1s. 3d. All in all, and with the usual political proviso so necessary these days, City Deep at their present level look to be almost the pick of the bunch for the buyer who wants to speculate on the chance of a higher gold price in due course.

A DECADE OF PROGRESS

At the annual meeting of International Nickel this week, Dr. John Thompson took the opportunity offered by the calendar of looking back over the last decade. It was entirely appropriate that he should do this for several reasons. First, 1959 had witnessed one of the sharpest and swiftest recoveries in the demand for nickel in the history of the metal. Second, the completion of the Thompson project in Manitoba in 1961 will commence a new era for nickel. Third, net earnings for 1959 were the fourth highest since the company was incorporated in 1916.

Deliveries of nickel reached a new peak at 317,000,000 lbs., a suitable ending to a decade. At the beginning of that period, deliveries had been 209,300,000 lbs.; there was consequently an improvement of over 50 per cent. Since the production of copper is intimately bound up with the nickel output, copper production also expanded, from 110,500 s. tons in 1949 to 126,200 s. tons in 1959, though they had been as high as 140,400 s. tons in 1957. Between this 1949 figure and that of 1957 was an improvement of 27 per cent. Production of the platinum metals in 1959 was only 214,735 ounces. It had more than doubled by 1955 to become 445,000 ounces, and although this high level has not been held owing to a fall in demand, the present level of 384,600 ounces compares very favourably with the figure of ten years ago.

Expansions of this order are not achieved without a good deal of capital expenditure. International Nickel spent $320,000,000 in this way. This is equal to roughly one-half of the total earnings for the decade of $688,000,000. The management has not allowed the formidable task of finding $320,000,000 to blind it to the task of remunerating shareholders during the period of expansion. Having received on an average $2.90 per share each year, including of course the year-end payments, out of average earnings of $4.70 per share, investors have no grounds for complaining of " jam tomorrow ".

The full text of Dr. Thompson's address appears on page 502.

POORER RESULTS FROM CENTRAL PROVINCES

Central Provinces Manganese Ore, the Indian producer, suffered a further setback in its earnings last year. This is blamed in the preliminary statement on the unsatisfactory demand for manganese ore throughout the period particularly from the United States as a result of the prolonged steel strike there. The directors are cutting the distribution from 3s. 2d. tax free per 10s. stock unit to 2s. 4d. tax free with a final payment of 1s. 2d. This shows that there is anyway some confidence in the outlook because it represents an overdistribution of the year's earnings. Trading profit of £901,649 is down by £562,430 compared with 1958. The net surplus after tax is £266,933. The dividends require £350,000. The carry-forward, however, is only £11,067 lower at £296,457 because there has been a transfer from tax reserve of £75,000 no longer required. The 1958 allocation of £40,091 to reserve is cut to a mere £3,000.

Central Provinces fell 4s. to 29s. 9d. following the announcement. At this level cum dividend the yield is fully 13 per cent. The chairman, Major A. C. Herring, usually reserves his speech for the meeting, to be held this year on June 8. It could be that he will have a little happier picture to paint now that the American steel industry is well under way again.

LONDON MARKET HIGHLIGHTS

After having steadied up previously, South African Gold share prices slid away again last week. The fall was not a result of any fresh adverse news from the Union, it was rather the result of technical influences on the market. In recent times Johannesburg has been taking a good deal of stock from London and there has been a considerable delay before the scrip has reached the South African buyers. Moves to speed up the delivery resulted in a rush of stock to that centre last week and a certain amount of forced selling there resulted. Cape Town was also reported to have turned a seller.

None of the selling was very large but it had an inevitable effect in what has become a virtually friendless market these days. Free State Geduld fell another 11s. 3d. to 118s. 9d. and Western Holdings at 116s. 3d. were similarly lower.

Western Deep came back to 38s. 1½d. and there can be little hope that the pending " B " share issue (at 40s.) will find much support from the public in these circumstances. Among the older mines a fall to 52s. 6d. in Geduld reflected some disappointment with the company's decision to stay in business as an investment concern. Finance Houses drifted with the rest, Anglo American falling to a new low for the year of 148s. 9d.

The dullness spilled over at first into an already uneasy Copper group. But that share section steadied up when the Chilean copper labour situation appeared to be taking a turn for the worse. With Europe now very tight for copper, it was realized that if the threatened stoppage at El Salvador were to spread to the other big Chilean mines, the need for production cutbacks on the Copperbelt might be deferred at least till the autumn. Meanwhile profits of the mines on the Copperbelt continue to run at a high level even with the present price of copper.

The heavy fall in Copper share prices since the beginning of this year has been even greater than that in Golds. Companies of high calibre in the Copper group are now giving yields of up to 8 per cent and a fresh increase in their dividends for current year's working is in prospect. So we may have reached the stage where the political risk attached to investment in Africa is largely allowed for in the price of these shares.

Meanwhile one of the very few share sections on the Stock Exchange that can still boast of glowing prospects, the Tin group, continued to forge ahead last week. Killinghall's return to the dividend list was greeted by a rise to 12s. 6d. in the shares and a persistent Singapore demand at one time raised Ayer Hitam to a new peak of 82s. 6d. Tronoh (35s. 9d.) were favoured by local investors and Malayan moved ahead to 25s. 3d. on a fairly general support. Tins paused for a breather on Wednesday when there was a little profit-taking. But the tiny increase in the Pahang interim caused some disappointment and the share price fell 9d. to 9s. 10½d.

Much more disappointing were the results from Central Provinces Manganese which disclosed a sharp setback in profits last year and a reduced dividend. The shares consequently dropped 3s. 10½d. to their lowest this year of 29s. 9d.

LONDON METAL AND ORE PRICES, APRIL 28, 1960

METAL PRICES

Aluminium, 99.5%, £186 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 10s. 6d. lb.
Cerium (99%) net, £16 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.
Cobalt, 12s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 5d. per gram
Gold, 250s. 0½d.
Iridium, £23/£25 oz. nom.
Lanthanum (98%/99%) 15s. per gram.
Manganese Metal (96%/98%) £275/£285
Magnesium, 2s. 2½d./2s. 3d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £22/£24 oz. nom.
Osmiridium, nom.
Palladium, Imported, £8 12s. 6d.
Platinum U.K. and Empire Refined £30 5s.
Imported £28½/28¾
Quicksilver, £70¾/£71 ex-warehouse
Rhodium, £45/£48 oz.
Ruthenium, £16/£18 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 79½d. f. oz. spot and 78¾d. f'd
Tellurium, 21s. 6d. lb.

ORES AND OXIDES

Antimony Ore (60%) basis		19s. 6d./21s. 6d. per unit, c.i.f.
Beryl (min. 10 per cent BeO)		230s. per l. ton unit BeO
Bismuth		65% 8s. 6d. lb. c.i.f. 18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—		
Rhodesian Metallurgical (semifriable 48%)	(Ratio 3 : 1)	£15 5s. 0d. per ton c.i.f.
,, Hard Lumpy 45%	(Ratio 3 : 1)	£15 10s. 0d. per ton c.i.f.
,, Refractory 40%		£11 0s. 0d. per ton c.i.f.
,, Smalls 44%	(Ratio 3 : 1)	£13 5s. 0d. per ton c.i.f.
Baluchistan 48%	(Ratio 3 : 1)	£11 15s. 0d. per ton f.o.b.
Columbite, Nigerian quality, basis 70% combined pentoxides (Ratio 10 : 1) Nb_2O_5 : Ta_2O_5		175s. per l. ton unit c.i.f.
Fluorspar—		
Acid Grade, Flotated Material		£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)		156s. 0d. ex. works
Lithium Ore—		
Petalite min. 3½% Li_2O		47s. 6d./52s. 6d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O		47s. 6d./52s. 6d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O		75s/85s. per ton f.o.b Beira
Magnesite, ground calcined		£28 0s./£30 0s. d/d
Magnesite Raw (ground)		£21 0s./£23 0s. d/d
Manganese Ore Indian—		
Europe (46%-48%) basis 67s. 6d. freight		73d./75d. c.i.f. nom.
Manganese Ore (43%-45%)		69d./71d. c.i.f. nom.
Manganese Ore (38%-40%)		nom.
Molybdenite (85%) basis		8s. 11d. per lb. (f.o.b.)
Titanium Ore—		
Rutile 95/97% TiO_2 (prompt delivery)		£28 0s. 0d. per ton c.i.f. Aust'n.
Ilmenite 50/52% TiO_2		£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)		145s./150s. per unit c.i.f.
Vanadium—		
Fused oxide 95% V_2O_5		8s./8s. 11d. per lb. V_2O_5 c.i.f.
Zircon Sand (Australian) 65-66% ZrO_2		£16/£16 10s. ton c.i.f.

ANGLO AMERICAN CORPORATION OF SOUTH AFRICA LIMITED

Gold Mining Companies in Klerksdorp and the Far West Rand

(All companies mentioned are incorporated in the Union of South Africa)

EXTRACTS FROM STATEMENTS BY THE CHAIRMEN OF THE COMPANIES

Issued with the Annual Reports and Accounts for the Year Ended 31st December, 1959

WESTERN REEFS EXPLORATION AND DEVELOPMENT COMPANY LIMITED

THE year 1959 was notable for the marked increase in activity in all spheres of operations at the company's mine.

At 1,582,500 tons the tonnage milled during the year was the highest in the history of the mine. There was a further improvement in gold recovery. The total footage developed increased substantially and was accompanied by a rise in percentage payability and in average gold and uranium values. There was a reduction in the ore reserve on the Ventersdorp Contact and Elsburg Reefs in the existing lease area, but this was more than offset by the increase in the ore reserve on the Vaal Reef and the additional tonnage blocked out on the Ventersdorp Contact and Elsburg Reefs in the Nooitgedacht area now being prospected under licence.

An improvement in the recovery grade at the uranium plant made it possible to meet the company's sales quota from the treatment of a lesser quantity of slimes. The total of the uranium output for the year and the surplus production brought forward from 1958 amounted to 733,146 pounds. Of this, 677,594 pounds were sold through the Atomic Energy Board and the balance of 55,552 pounds was carried forward for disposal in 1960.

The working profit from gold and the estimated profit from uranium and sulphuric acid was £3,083,522. Sundry income exceeded sundry expenditure by £92,193, making the surplus for the year £3,175,715. Taxation and the government's share of profits absorbed £1,435,698. A total of £701,696 was appropriated for expenditure on fixed assets and to provide for the redemption of the uranium loans £875,000—representing unchanged dividends totalling 2s. 6d. per share—was distributed to members.

New Shaft System

During the year the consulting engineers gave further consideration to the problem presented by the need to hoist increasing tonnages mined from the Vaal Reef horizon through the No. 3 Joint Shaft and to the question of how best to exploit the north-western and northern areas of the mine. Since the year end, it has been decided to sink a new shaft system (No. 4 Shaft) at a point about 12,500 feet north-west of No. 3 Shaft. This shaft system is to be sunk to a depth of about 6,700 feet. The cost of the shaft system is estimated at £2,900,000, which it is proposed to finance from profits. It is hoped that it will prove possible for dividends to be maintained at about the present level during the shaft-sinking period. Preparatory work on shaft site has started and sinking operations should commence about April, 1961. The shaft should be commissioned by about the end of 1962.

Capital expenditure for 1960 is estimated at £1,051,000 which includes an amount approximately £753,000 to be spent on the preparatory work connected with the sinking of the No. 4 Shaft.

Encouraging Development Results

The results of prospecting development in the Nooitgedacht area have been encouraging By the end of 1959 a total of 79,333 feet had been driven and 45,725 feet sampled. Of the footage sampled, 20,685 feet or 45.3 per cent had proved payable with an average value of 14.75 dwt. per ton over a width of 36.6 inches equivalent to 540 inch-dwt. At the year end it was estimated that a total tonnage of 1,137,300 tons had been blocked out with an average value of 6.18 dwt per ton. An application has been made to the Mining Leases Board for the grant of a mining lease over an area of approximately 916 claims extending westwards from the lease boundary.

Development on the Elsburg and Ventersdorp Contact Reefs elsewhere in the mine consisted of further work in the Goedgenoeg area and in the old lease area where proved blocks of ore were split up. On the Vaal Reef horizon development on the 50 South Level between Boreholes WK3 and WK27 was discontinued because results were disappointing. Good results were, however obtained in development to the west of 62 West Haulage and off 59 South Haulage and work on the 62 and 65 Levels towards the eastern boundary north of the No. 3 Joint Shaft continued to give good values. Satisfactory values were also encountered in the further development done off the end of 62 West Haulage in the vicinity of Borehole N.14. This latter development has now been stopped because sufficient information has been gained and because of the difficulty in maintaining operations so far from the shaft.

In the last quarter of 1959 the Transvaal and Orange Free State Chamber of Mines agreed on behalf of the uranium producing companies to participate with the Union Government and certain industrial concerns in the financing of a programme of atomic research. It was estimated that the programme would cost £4,000,000 spread over a period of five years. The Chamber of Mines agreed that the uranium producing companies would contribute £2,000,000 in instalments of £400,000 per year and that the proportion to be contributed by each producing company would be based on its sales of uranium. This company's contribution towards the first instalment amounted to £21,420.

VAAL REEFS EXPLORATION AND MINING COMPANY LIMITED

EXCELLENT progress was made in the sinking of the No. 2 Shaft system intended to provide direct access to the Vaal Reef underlying the south eastern part of the company's property.

Remarkable Shaft Sinking Achievements

Preparatory work on the main shaft was completed in July when the mine crews took over sinking operations. By the end of the year, the shaft had reached a depth of 4,480 feet below surface, representing an average of 713 feet sunk per month over the period of six months. In September a world record of 922 feet was established. This was bettered in November but the total of 954 feet sunk was exceeded in the Orange Free State by the President Steyn gold mine which sank 1,001 feet in that month to set up a new world record. Sinking operations were commenced in the ventilation shaft at the Vaal Reefs mine in September and by the end of 1959 this shaft had reached a depth of 1,894 feet. The mine management and the sinking crews are to be congratulated on these remarkable achievements.

At the end of February, 1960, the main ventilation shafts had reached depths of 5,293 feet and 3,185 feet from the surface respectively. If sinking continues at the present rate, the main shaft should be completed to its final depth of 7,100 feet in the last quarter of 1960. In the initial stages of this shaft's operation it is now planned to hoist from about the 62nd Level, which means that it will probably prove possible for the shaft to be commissioned in the first quarter of 1961 some months earlier than was forecast last year. The ore and waste passes to the bottom of the main shaft will be completed later.

On January 27, 1960 the Vaal Reef was intersected in the main shaft at a depth of 4,880 feet, giving a value for

gold of 36.69 dwt and for uranium of 1.90 lb per ton over a channel width of 22.33 inches equivalent to 819 inch-dwt and 42.41 inch-lb respectively.

While the sinking of the No. 2 Shaft system was proceeding, the scale of mining operations elsewhere in the mine was increased. Alterations were made in the hoisting arrangements at the No. 1 and No. 3 Shaft systems. Underground ventilation was improved by the installation of additional fans and a second refrigeration plant. These changes, together with the increase in the supply of Native labour, made it possible for a substantially greater quantity of ore to be mined. The milling rate reached its peak of 100,000 tons per month in September and October and has since fallen back with the seasonal fluctuation in Native labour. The indications are that until the No. 2 Shaft system is commissioned, production cannot be increased much further. In the meantime, work is proceeding on the extension to the reduction plant to give it a rated capacity of 125,000 tons per month. It is planned to increase the plant's capacity to 150,000 tons per month at a later stage.

An increase in the recovery grade at the uranium plant made it possible to meet the company's sales quota from the treatment of a lesser quantity of slimes. The excess slime discharged from the gold plant is being placed on a separate dam so that, if need be, it can be readily returned to uranium plant for treatment. During the year 608,000 pounds were produced which, with the excess production of 12,547 pounds in 1958, brought the total available for disposal in 1959 to 620,547 pounds. Of this, 570,293 pounds were sold through the Atomic Energy Board and the balance was carried forward for disposal in 1960.

Although the total footage developed was somewhat less than in 1958 the footage sampled at 32,845 feet was about the same and the opening up of the mine is proceeding satisfactorily.

Development Values

In January, 1960, the 50 South East Haulage driven through the Kromdraai Fault from No. 1 Shaft intersected the Vaal Reef in the vicinity of No. 2 Main Shaft. Of the total footage developed in the shaft area up to the end of February, 1960, 850 feet were sampled giving an average value for gold equivalent to 910 inch-dwt and for uranium equivalent to 35.57 inch-lb. 91.8 per cent. of the footage sampled proved payable with an average value for gold of 70.41 dwt and for uranium of 2.74 lb. per ton over a channel width of 13.99 inches, equivalent to 985 inch-dwt and 38.36 inch-lb. respectively. These results taken in conjunction with the values disclosed in Boreholes M.6 and M.7 indicate the possibility of there being a considerable area of good payability in this part of the property. The reef exposed above 53 South East Haulage off the Kromdraai Fault has been opened up and is now being stoped. Good values have been disclosed in the vicinity of 50 South Haulage in the area south west of No. 1 Shaft. Values encountered to the north and north west of No. 1 Shaft, however, continue to be lower than the average for the mine. Values have also been found to decrease in development southwards from the No. 3 Joint Shaft. The year's development programme adequately met the increased demand for tonnage mined and served to increase the ore reserve by 669,000 tons, bringing the total to 2,950,000 tons with an average value for gold of 9.369 dwt and for uranium of 0.744 lb. per ton.

The workng profit from gold and the estimated profit from uranium was £4,261,451. Sundry income exceeded sundry expenditure by £32,903, making the surplus for the year £4,294,354. £2,231,384 was appropriated for expenditure on fixed assets and to provide for the redemption of the uranium loans. £1,837,500 was distributed by way of dividends representing 3s. 6d. per share.

Capital expenditure for 1960 is estimated at £3,142,000. The assessed loss for tax purposes at December 31, 1959, was estimated at £5,007,000.

In the last quarter of 1959 the Transvaal and Orange Free State Chamber of Mines agreed on behalf of the uranium producing companies to participate with the Union Government and certain industrial concerns in the financing of a programme of atomic research. It was estimated that the programme would cost £4,000,000 spread over a period of five years. The Chamber of Mines agreed that the uranium producing companies would contribute £2,000,000 in instalments of £400,000 per year over this period and that the proportion to be contributed by each producing company would be based on its sales of uranium. This company's share of the first instalment of £400,000 was £18,030.

WESTERN DEEP LEVELS LIMITED

THE Western Deep Levels mine, in view of its exceptional size and cost, has posed problems that have required many years of research and planning. The value of the findings derived from this initial programme is only now becoming apparent, and the past year's results have shown that satisfactory progress has been made in all spheres of operations on the mine. Surface installations are being commissioned according to schedule and housing requirements are being met. Shaft sinking through 5,000 feet of dolomites was delayed on account of extremely difficult conditions but a reasonable rate of sinking was maintained.

By the end of the year both shafts of the No. 3 Vertical Shaft system and the main shaft of the No. 2 Vertical Shaft system had passed out of the dolomites and through the Black Reef into the lavas. By the end of February 1960, the No. 3 Shaft system had been sunk to its final designed depth of 6,354 feet. The main shaft of the No. 2 Shaft system had reached a depth of 5,508 feet and the ventilation shaft had entered the lavas and was at a depth of 5,226 feet.

The main shaft of the No. 3 Shaft system is being stripped of sinking equipment preparatory to its being re-equipped for hoisting. Meanwhile development has been started from the bottom of the ventilation shaft and, as soon as the necessary pump chambers, waste passes and other essential facilities have been provided, it is planned to cross cut on three levels to the Ventersdorp Contact Reef. As soon as the main shaft is ready for hoisting, the intention is to continue sinking the ventilation shaft using the surface hoists, down to about 7,000 feet.

The sinking of the No. 2 Shaft system was delayed during the year by the intersection of water-bearing zones and is now some months behind the No. 3 system. Although the position has improved since these vertical shafts entered the lavas, this system is unlikely to be down to its final depth until towards the end of the current year. On March 10, 1960, the main shaft intersected the Ventersdorp Contact Reef at a depth of 5,599 feet giving a value for gold of 7.59 dwt. per ton over a channel width of 41.50 inches equivalent to 315 inch-dwt.

Development

The development done to the end of February, 1960, on behalf of the company on 58 Level Drive East by the West Driefontein mine has been disappointing. Of the total footage sampled up to the end of February only 7.5 per cent has proved payable with an average value of 22.80 dwt. over a channel width of 16.10 inches, equivalent to 367 inch-dwt. Experience gained elsewhere in mining the Ventersdorp Contact Reef has indicated that enrichment occurs in large zones separated by areas of low payability. 58 Level East is being driven with the object of prospecting for the zones of enrichment and of facilitating the planning required for the exploitation of this reef.

Capital expenditure during 1959 amounted to £3,432,012. Expenditure on shaft sinking, buildings and equipment accounted for £2,910,581. £485,457 was spent on the purchase of housing. General capital expenditure amounted to £28,678 and trade investments were increased by £7,296. Capital expenditure in 1960 on shaft sinking, buildings, development and equipment is estimated at £6,395,000.

The excess of funds raised over expenditure on fixed assets at December 31, 1959, was £918,858. These funds have now been exhausted.

Increase of Capital

In anticipation of the exhaustion of the company's funds, a circular was issued to members on March 9, 1960, convening an extraordinary general meeting of members for March 31, 1960, for the purpose of considering the directors' proposals that the portion of the authorized capital represented by "B" shares of £1 each should be increased to 13,000,000 "B" shares and that these shares should be placed in the hands of the directors for issue at their discretion. Included in the notice convening the meeting was also a proposal that the directors' borrowing powers should be increased from £10,000,000 to £15,000,000. Of the 13,000,000 "B" shares, 5,000,000 must be held in reserve against existing subscription rights held by the Loan Syndicate and that the balance would be available for raising further funds.

It was reported in the circular that the total of the expenditure to the end of Stage 1, when it is hoped to bring the mine to initial production on the Ventersdorp Contact Reef, was now estimated at £27,100,000 as compared with the estimate of £21,100,000 in the prospectus issued in January, 1959. Approximately £3,936,000 of the excess was attributable to the planned advancement of further work on the sinking of the subvertical shafts from Stage 2 to Stage 1 and to the decision to buy or build houses, in preference to leasing, for the company's European employees in Carletonville; the balance, in the main, representing provision for a somewhat higher cost of sinking opera-

tions and for the finance and other charges likely to be incurred in raising additional funds.

As the board had arranged to finance the additional cost of the housing, estimated to the end of Stage 1 at £2,000,000, by means of building society loans, this meant that, allowing for the capital funds raised to date and the building society loans, further funds amounting to approximately £14,500,000 would be required to finance expenditure to the end of Stage 1. At the time of writing, the board is considering how best to raise these funds. In the meantime, the company's operations are being financed by temporary loan facilities granted by Anglo American Corporation of South Africa Limited.

Personal

Dr. D. R. Derry has resigned as vice-president (exploration) and director of The Rio Tinto Mining Co. of Canada Ltd., in order to conduct independent consulting practice. Dr. Derry, who has been in charge of the exploration activities of the Rio Tinto Group in Canada from its early days, will continue in active association with The Rio Tinto Mining Co. of Canada Ltd., as well as with the Rio Tinto Co. of London in its world-wide interests. J. Arthur Sadler, vice-president of Rio Tinto Canadian Exploration Ltd., becomes director of exploration for Rio Tinto in Canada and will assume full charge of Rio Tinto Canadian Exploration activities.

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Mr. T. Lawman has been appointed head of public relations to The Cementation Group of Companies. Former editor of *East Africa News Review* Mr. Lawman has also held the appointments of inspector of information services to the Northern Rhodesia Government and information officer to the Northern Rhodesia Chamber of Mines.

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Mr. N. R. D. Gurney, has relinquished the position of manager, A.E.I. Heavy Plant Division's Large Electrical Machine Sales (Manchester), but will remain a member of the executive of Heavy Plant Division. Mr. I. A Ferguson, M.I.E.E., hitherto manager, Large Electrical Machine Sales (Rugby) assumes responsibility for the entire department and Mr. J. Cannell, B.Eng., A.M.I.E.E., is appointed assistant manager.

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Mr. A. G. Banks has been elected president of the Engineering Centre, Birmingham, in succession to Mr. V. Brenner.

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After fifty years with the Shap Granite Co. Ltd., Mr. J. W. Millray retired on March 31 from active duties. He still continues on the board and will act in an advisory capacity.

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Mr. E. W. Molesworth has been appointed chief engineer for the London, Southern and Eastern areas for the Engineering Group of The General Electric Co. Ltd.

INTERNATIONAL NICKEL COMPANY OF CANADA

A DECADE OF PROGRESS
FURTHER EXPANSION IN 1960's FORESHADOWED
MARKET DEVELOPMENT AND RESEARCH CONTINUED

The annual meeting of The International Nickel Company of Canada, Limited was held on April 27 in Toronto.

Dr. John F. Thompson, the Chairman, presided and, in the course of his speech, said :

Net earnings for the year 1959 were the fourth highest in the history of the Company, amounting to $85,100,000. This was an increase of $45,400,000 over 1958.

As a result of a world-wide rise in industrial activity, our deliveries of nickel in all forms last year reached a new peak at 317,000,000 pounds, contrasted with 205,800,000 pounds in 1958. Strong demand in Europe largely offset the effect of the prolonged steel strike in the United States. Copper deliveries of 252,400,000 pounds in 1959 were 41,800,000 pounds higher than in 1958. Copper prices in free world markets averaged about five cents per pound higher than in the preceding year.

Platinum and palladium prices recovered substantially because of increased demand and apparent changes in selling policy by the Soviet Union with respect to these and other metals. Deliveries of platinum metals totalled 384,600 ounces, contrasted with the post-war low of 145,400 ounces in 1958. Nickel and high-nickel alloy rolling mill and foundry products, produced by the Company in the United Kingdom and the United States, continued to constitute a substantial part of our business. Deliveries of these products in 1959 amounted to 67,800,000 pounds, about 14 per cent above the previous year.

The Fifties — Decade of Progress

The decade of the Fifties was one of progress for our Company. We are now on the threshold of a new decade with even greater promise. Our new nickel development in Manitoba, improvements in production procedures, including some quite radical in nature, reorganized marketing and distribution activities and more intensified research—both process and product—will all contribute to continued growth.

Our annual capacity for nickel production has been increased materially during the past 10 years. In addition, completion of the Thompson project in Manitoba in 1961 will provide the Company with initial capacity for a further 75,000,000 pounds of nickel per year.

Deliveries of nickel increased from 209,300,000 pounds in 1949 to 317,000,000 pounds, a new high, in 1959. Copper deliveries advanced from 221,100,000 pounds in 1949 to the post-war high of 280,800,000 in 1957. Annual deliveries of platinum metals in the decade averaged 315,000 ounces, with a high of 445,000 in 1955. Deliveries for the 10 years totalled 2,670,000,000 pounds of nickel, 2,450,000,000 pounds of copper and 3,150,000 ounces of platinum metals.

Annual earnings in the 10 years 1950-1959 averaged $68,800,000, or about $4.70 per common share, and common dividend payments averaged $42,700,000, or over $2.90 a share, including year-end extra payments.

Over the 10-year period, the Company maintained its customary strong financial position and, looking to the future, returned to the business substantial amounts for exploration, plant expansion and modernization, and process improvements. The strong financial position enabled the Company to proceed in December, 1956, with the new nickel development project in Manitoba and also to retire in February, 1957, all of the outstanding preferred stock which necessitated a cash outlay of $34,700,000 —both without recourse to outside financing. The preferred stock had a history dating back to the formation of International Nickel in 1902.

Capital expenditures of $320,000,000 were made in the 10 years chiefly to increase nickel production capacity and improve operations at our plants in Canada, the United Kingdom and the United States. Of this amount almost 30 per cent was expended for the Thompson, Manitoba, development.

With the imminence of production from Manitoba, the Company during the latter years of the 1950's intensified its market development activities and market research throughout the world with the aim of creating and increasing markets for nickel or recovering those lost to other materials during the years when defence and government stockpiling took a disproportionate amount of all available nickel. The Company's marketing, sales and product research staffs have been expanded and realigned, and certain changes have also been made in its world-wide distribution system. The object of these activities has been to increase sales of nickel by helping producers and manufacturers of nickel-containing products to expand their sales. These efforts are already producing gratifying results in the face of keen competition from other metals and materials. We believe this work will continue to assist in substantially increasing the demand for nickel in the current decade as well as further establishing the Company in its traditional position of working to aid its customers.

Co-operation — Market Development and Research

Your Company has always placed great importance on the development and expansion of markets for its products. Because we are the principal producer of nickel, we have been the leader in developing the nickel market. The Company has always sought and welcomed the co-operation of others in development work designed to expand and create uses for nickel.

Typical of these efforts was the "Gleam of Stainless Steel" promotion in early 1959 conducted in co-operation with leading department stores in key cities in the United States and Canada, and manufacturers of housewares and stainless steel producers. This was designed to increase the use of nickel stainless steel consumer products. A similar programme was undertaken in the United Kingdom by our affiliate, The Mond Nickel Company, Limited. Because of the success of this promotion, it is being repeated this year on an even larger scale.

Promotional activities are also being pursued vigorously in other nickel-consuming fields. For example, a drive is under way to strengthen public preference for quality nickel - chromium plating in all applications, since the most satisfactory chromium plate requires an adequate underlay of nickel.

Besides operating its own laboratories, the Company also conducts research in outside laboratories to supplement its own work and co-operates closely with steel producers and other nickel consumers in the development of new and improved nickel-containing products. We actively support the work done by many technical societies, such as the American Society for Testing Materials and the American Electroplaters' Society in the United States; the British Iron and Steel Research Association and the British Non-Ferrous Metals Research Association in the United Kingdom, and the Canadian Standards Association and the Canadian Welding Bureau in Canada.

International Nickel is also active on an international scale in co - operative efforts to broaden and increase the market for copper, of which we are one of the world's large producers. In tonnage, our copper production is second only to nickel among the 14 elements the Company recovers from its ores. The Mond organization is a founder member of the Copper Development Association in Great Britain started in 1933. International Nickel is a charter member of both the Canadian Copper and Brass Development Association formed in 1958 and the Copper Products Development Association recently organized in the United States.

As a producer of cobalt, selenium and tellurium, International Nickel is also a member of the Cobalt Development Institute, a world-wide group meeting in Brussels, and of the Selenium and Tellurium Development Committee.

Through membership in various technical committees, the Company maintains liaison with technical societies and also interested government departments in Canada, the United Kingdom, the United States and other countries. I am sure I can say that whenever and wherever throughout the free world there is a technical gathering of interest to the nickel industry and its customers there will be an International Nickel representative in attendance to offer co-operation.

Manitoba Project

Mine development at Thompson, Manitoba, proceeded on schedule throughout 1959. Since the beginning of exploration work the total amount of diamond drilling completed at the Thompson Mine up to the end of 1959 was over 280,000 feet. Up to the year-end, some 95,000 feet, or about 18 miles, of development advance had been driven. The 2,100-foot production and the 1,100-foot development shafts were connected at four levels. Development of stopes and other operations preparatory to mining are under way and will continue into the latter part of this year.

During 1959 the mill building and the smelter building were completed with the major portion of equipment installed. Construction of the electrolytic refinery at Thompson has proceeded rapidly, and production of electrolytically-refined nickel from this refinery is scheduled for the first part of 1961.

Construction of the Kelsey power station by The Manitoba Hydro-Electric Board progressed satisfactorily during 1959. A fire, originating in construction material, in January, 1960, will cause only slight delay in delivery of the first power to Thompson. Initial delivery of power to us from Kelsey, which is 53 miles northeast of Thompson, is scheduled for June, with full output early in 1961.

Rapid strides were made during the year in the development of the town of Thompson, which will provide facilities for 2,000 Inco employees and their families as well as for individuals employed by other firms. Thompson will be the most modern community in Manitoba. The town is located within the Local Government District of Mystery Lake, established under Manitoba law and administered by an administrator appointed by the Province.

As a contribution to the development of Thompson, the Company is providing and clearing the land, and is defraying the cost of town planning, utilities engineering and installation of various basic facilities required in such a town. These include underground storm drainage and sanitary sewer systems, a domestic water supply system, roads and sidewalks, a modern water treatment plant, a sewage disposal plant, a town administration building, a fully-equipped 32-bed hospital designed for expansion to 64 beds, and three completely-equipped elementary schools plus one high school.

The Company's total expenditures to carry out the extensive activities involved in all phases of the Manitoba project since development work was started in December, 1956, have amounted to over $100,000,000 to date. It was originally estimated at the time the Manitoba project was in the planning stage that our total cost would be $115,000,000. The Company's subsequent decisions to provide a refinery in Manitoba with a capacity of 75,000,000 pounds and to further enlarge the planned facilities at Thompson will will bring the total cost to Inco to approximately $125,000,000.

European Free Trade Areas

A second European free trade area—the European Free Trade Association—has recently been organized and plans to effect the first tariff reductions among its members around the beginning of July. The association is composed of the United Kingdom, Sweden, Norway, Denmark, Switzerland, Austria and Portugal. Representatives of these seven countries had met in Stockholm, Sweden, in November, 1959, when a treaty was drawn up to abolish, within 10 years or earlier, tariffs and other obstacles to the mutual trade of these nations. The new grouping has become known as the "Outer Seven," because of its geographical location relative to the "Inner Six" — France, West Germany, Italy, Belgium, the Netherlands and Luxembourg — associated in the "Common Market," or European Economic Community, which began lowering trade barriers among its members when it started to operate in January, 1959.

While a common purpose of both groups is the gradual removal, within each group, of tariffs and import quotas on industrial products, in other respects there are profound variations. Fundamentally, the "Outer Seven" is endeavouring to promote free trade among its members with a minimum of commitments on their part regarding econonomic and financial policies; the "Inner Six," on the other hand, seeks to use free trade as an instrument of broader economic — and, eventually, political—integration.

Members of the "Outer Seven" may retain their individual tariffs toward outsiders, change them at will, and conduct their own commercial negotiations with other countries. Conversely, the "Inner Six" is to establish common tariffs with respect to the rest of the world, and is to have a unified commercial policy.

In recent years Europe has been going through a period of great and growing prosperity with resulting high demands for nickel. With the beginning of the implementation of the "Common Market" and the European Free Trade Association, new elements are introduced, the effects of which can at the moment still only be surmised.

Much will depend on the actions taken, that is, on whether these countries will create protected markets against the rest of the world, or whether their basic impulse is to create a world in which all can trade freely. Added to this is the question of the increase in the material standard of living in Europe and throughout the world. At present, opinion seems to be divided between those who believe that these markets will be greatly restricted and those who believe that expansion of demand in Europe will continue to such an extent as to overwhelm any other features.

First Quarter Earnings

Net earnings for the first quarter of 1960 will be significantly higher than the $16,900,000 reported for the first quarter of 1959. While nickel deliveries in March tapered off slightly from the extraordinarily high levels of the first two months, the rate of deliveries for the quarter was greater than our production.

Outlook

The free world nickel supply situation has undergone important changes from the period of a few years ago when the industry had difficulty in meeting simultaneously the demands for both current consumption and stockpiling. Following a period of diminished demand in 1958, demand rose sharply in 1959. This expanding demand permitted the United States Government to make available some of its surplus nickel thereby reducing the Government's excess accumulation.

It is expected that demand for nickel during the remainder of 1960 will continue high. This demand can be more than satisfied by the industry's increased productive facilities and by the available nickel supplies. Looking at the situation for 1961—Inco's Manitoba project will come into production and, although nickel operations in Cuba are now hampered, other nickel producers are also increasing their capacities and further developing their operations toward an even higher production rate.

Development work on the applications of nickel during 1959 was conducted on a more highly organized and efficient world-wide basis. The current expansion in nickel use, spurred on by marketing and research activities, should continue. These efforts will provide a foundation for absorbing the new nickel supplies and augur well for the progress of the nickel industry in the decade which we have now entered.

The report and accounts were adopted.

THE RHODESIA BROKEN HILL DEVELOPMENT COMPANY LIMITED

(Incorporated in Northern Rhodesia)

FINANCE FOR EXPANSION PROJECT

FUTURE PROSPECTS VERY PROMISING

The following is from the review by the chairman, **Mr. H. F. Oppenheimer,** which has been circulated with the annual report and accounts :—

At this time last year the price of zinc had begun a steady upward movement because of increased demand and I am happy to say that this improvement continued, so that the average price we received for our zinc in 1959 was some £15 a ton higher than the previous year. The lead market did not show the same buoyancy and the average price received by us during the year was some £5 a ton lower than during 1958.

The profit for 1959, after providing £343,000 for taxation, was £885,000, nearly £300,000 more than last year. This is very satisfactory as we have been able to appropriate an amount of £400,000 for capital expenditure mainly to meet amounts spent during the year on the expansion programme, and at the same time have been able to recommend a final dividend of 6d. which, with the interim dividend of 3d. makes 9d. for the year. A further welcome decrease in the stores at the mine released an amount of £88,000 which was used for financing ordinary capital works.

Imperial Smelting Furnace

In January 1960 you were advised that we had accepted the recommendation of the Consulting Engineers that an Imperial Smelting Furnace and the ancillary plant should be erected at the mine. Work has already started on clearing the site, and contracts for the erection of the plant are being placed.

The cost of the project is £4,350,000, including additional housing for the increased staff and the installation of a further generator at the Lunsemfwa Hydro Electric Station to provide for the required additional electric power.

As I mentioned earlier, we were able to provide £400,000 from available resources for the investigation and preliminary work and the cost of the rights and designs for the process. As we still have a further amount of about £400,000 in hand by way of net current assets the amount to be found for the expansion project is reduced to £3,550,000. The arrangements for raising the sum of £3m. provide for half this amount to be raised by the issue of £1,500,000 of 6½ per cent. unsecured redeemable notes in June 1960; and for the note-holders to have the right to subscribe at 10/- per share for two ordinary shares for every £1 of notes held in June 1962. Anglo American Corporation of South Africa, Limited has undertaken to underwrite both the issue of notes and the provision of £1,500,000 in June 1962. It is, of course, very difficult to estimate exactly when the money will be spent, and for that reason we have arranged for loan facilities of £1,500,000 to be available to the Company up to June 1962, when any amounts drawn will be repaid from the proceeds of the issue of the 3,000,000 ordinary shares to noteholders.

Provided no unforeseen circumstances arise and the prices for lead and zinc remain around the present levels, we expect to be able to retain from profits over the next few years the balance of £550,000 required to complete the project and also the money required for ordinary capital expenditure at the mine. The new money to be raised, together with short-term loan facilities, will, we hope, make it possible so to gear the capital to be provided from profits that we shall be able to maintain dividends at the rate we have recommended for 1959 until the new plant comes into operation, after which we hope materially to increase distributions to stockholders.

Production Plans

The Imperial Smelting Furnace and ancillary plant is to be integrated with the existing plant and will produce lead and prime Western grade zinc. The leach plant will continue to produce electrolytic zinc. A treatment programme blending mine ore with dump material has been prepared so as to make the best use of both plants. It is planned to mine some 200,000 short tons of ore a year and to draw between 30,000 and 40,000 tons each year from the accumulated dumps of mixed fines tailings and other dump material. Zinc production will be of the order of 50,000 long tons per annum with some additional production in the early years from the zinc concentrate stockpile. Lead production will be about 28,000 long tons per annum but this will slowly decrease as ore is drawn from the lower levels of the mine where the percentage of lead in the ore is calculated to be less than is in the ore being currently mined.

The calculation of the ore reserves at the year end was done on a revised basis because experience has shown that too great an allowance was made previously for cavities in the orebody. This factor, together with the inclusion of a new block of ore in the indicated reserves, brings the total ore reserves to 5,870,000 short tons, an increase of 725,000 short tons over last year's figure. The rate of mining contemplated when the Imperial Smelting Furnace is in operation would indicate a life of almost thirty years, but it is impossible to say how much of the ore reserves contained in safety pillars will ultimately be recovered and for planning purposes, therefore, we propose at present to regard the life of the mine as about twenty-five years.

Underground exploration is being continued below the indicated ore reserve areas and work will also be carried out to establish whether any additional orebodies exist in the vicinity of the present workings. On the surface several promising indications of ore have been found adjacent to the mining area and a small tonnage of low grade zinc ore has been proved at one of them but no extension of this has yet been found at any depth; exploratory work is continuing. Our company also owns several properties which are potential sources of ore and these are being re-examined. At the Star zinc property there is a body of high grade zinc silicate and limestone deposit which was worked on a small scale many years ago. Diamond drilling to test this property will begin shortly as it is thought that this ore and the limestone, if available in quantity, will be beneficial to the metallurgical processes.

The outlook for zinc in 1960 is encouraging and the present price of lead is satisfactory. A careful survey of the effects of introducing the new process indicates that there will be a reduction in the costs of production. The new process itself should nearly double the output without materially affecting the life of the mine, and the future prospects are therefore very promising.

Company News

Two compressed air adsorption dryers for use by the National Coal Board and the Air Ministry were exhibited by AEI - Birlec Ltd., at the Compressed Air and Hydraulics Exhibition held at Olympia from April 25 - 29, and reported in last week's issue. The BYG dryer is to be used by a colliery in the East Midlands.

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An exhibition by The Mond Nickel Co. Ltd., at Moore's Hotel, Glasgow, from May 3 to May 6, 1960, is primarily intended to emphasize the importance of nickel and the platinum metals in modern industry. Exhibits will illustrate and in certain cases demonstrate, by working models, the properties of nickel-containing materials and the platinum metals.

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A new company, British Ore Investment Corporation Ltd. (B.O.I.C.), with a share capital of £5,000,000, has been formed by nine of the principal British steel-making companies using imported ore and by British Steel Corporation Ltd., an investment-holding company associated with the British Iron and Steel Federation. The main object of B.O.I.C. is to hold investments in overseas ore-mining companies — a function formerly undertaken for the British steel industry by British Steel Corporation alone. Amongst other investments, B.O.I.C. has taken over British Steel Corporation's 20 per cent interest in Société des Mines de Fer de Mauritanie (MIFERMA), a £60,000,000 project in French West Africa whose capital, equivalent to about £19,000,000 is being subscribed together with French, Italian and German interests. The ultimate intention of MIFERMA is to produce 6,000,000 tons of iron ore a year. The ore will be transported on a railway, to be specially constructed, over a distance of about 400 miles to a port to be built near Port Etienne in Mauritania. B.O.I.C. has also taken over the 30½ per cent British participation in Compagnie Minière de Conakry, a company mining ore in the Republic of Guinea.

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Sandvik Steel Works, Sandviken, Sweden, have been granted a licence to build a factory in India at Poona about 150 miles east of Bombay. Both tungsten - carbide bits and finished products will be produced and the total investment in land, buildings and machines is estimated at £550,000. An Indian company, Sandvik Asia Ltd., will be formed to take charge of the planned production. The project will be financed by both Swedish and Indian capital. Production will start in 1961.

THE BRITISH PETROLEUM COMPANY

STRONGLY COMPETITIVE MARKETING CONDITIONS

The 51st Annual General Meeting of The British Petroleum Company Limited will be held on May 19 in London.

The following is an extract from the Statement by the Chairman, **Sir Neville Gass, K.B.E., M.C.,** which has been circulated to Stockholders :

The Group's sales for 1959 of crude oil and refined products totalled 65,000,000 tons, and the Group's net income was just over £63,000,000. For the first six months of the year, the sales tonnage was practically the same as in the first six months of 1958. The year's increase of some 3,000,000 tons was thus secured mainly in the second half-year. This is an encouraging feature, as also is the growth of nearly 10 per cent in the inland trade in products of our marketing associates.

The Group's income, before taxation, was £131,000,000. This was less by £7,000,000 than in 1958, although the sales tonnage increased—a reflection of the depression in prices caused by the strongly competitive market conditions, which showed no improvement as the year progressed. Due to the reduction in the charge for taxation, the Group's net income, at £63,000,000, was practically the same as in 1958 and, after allowing for the recommended dividend, there has been retained in the business a total of £97,000,000.

The total capital expenditure of our Group in 1959 amounted to £141,000,000, an increase of £3,000,000. We must be prepared to continue to find large sums for capital expenditure since to attempt to stand still would result in going backwards. This would be detrimental to our competitive position as a major British interest in the international oil industry, and also inconsistent with the development responsibilities inherent in the extent of the resources of crude oil to which we have entitlement.

The Outlook

Turning to the general position of the industry, 1959 showed an appreciable recovery in the rate of expansion of demand, but the industry is likely to have to face the difficulties due to the overabundance of available supply for a further considerable period.

It is to be hoped that the increasing supplies from new sources will come into the supply pattern in a steady and not disruptive manner. Forced development can disregard the interests of established supply sources which continue to be needed for the fulfilment of the total requirements and for many of which the maintenance of oil revenue is essential for their social and economic development, itself indispensable for progress and stability.

In our case the total sums included in our 1959 Accounts for payment to the Middle East countries under fifty-fifty agreements amount to £115,000,000, and, as in 1958, these sums greatly exceed the Group's net profit for the year, £63,000,000.

In the year 1960 we are expecting an increase in our sales but, again, it would be imprudent, market conditions in the Eastern Hemisphere being what they are, to expect any material increase in the trading margins though we are paying particular attention to economy in operation in all sides of the business in order to mitigate the effects of the depression in selling prices.

The difficulties of the present situation, though not likely to disappear in the immediate future, should not be allowed to obscure the encouraging longer term prospects of the oil industry. The growth of population, expansion in world economy, industrialization and improvement in living standards, particularly in under-developed countries, will be accompanied by a continuing increase in the demand for energy in which oil has a major role to play. The oil industry, granted freedom of international trade, should therefore continue to enjoy confidence as a growth industry and we are well placed to participate in this growth.

Distribution and Sales

Whilst our total sales of crude oil and finished products at approximately 65,000,000 tons showed an increase of over 4 per cent, compared with 1958, inland sales of products through our associated marketing companies increased by nearly 10 per cent, thus confirming the trend to cover a greater proportion of our total product sales through our own direct marketing organizations.

In the field of lubricants we have had a successful year, and demand for our BP Energol Visco-Static motor oil has continued to grow. A new lubricant under the name of BP Energol Tractor Oil Universal, designed to meet the requirements of engines, hydraulic systems and transmissions of every major tractor manufacturer in Europe, has been developed and put on the market. Our recently developed branded product for two-stroke engines, BP Zoom, has been introduced into new markets and has enjoyed a rapid growth in sales.

Personnel

I conclude by paying a tribute to the staff of our Company and the fact that it is customary does not make the tribute less sincere, or less well earned. BP is an international concern and in the past few years I have been privileged to travel to many of our centres of operation and see our staff at work; I have always been most impressed by their enthusiasm and interest in the Company's progress.

Improved Results by Atlas Copco.—Atlas Copco AB, the Stockholm firm of compressed air engineers, made a net profit in 1959 of Sw. Kr. 8,124,408 (£560,304). This compares with a net profit of Sw. Kr. 7,100,000 (£489,149) in 1958. A dividend of Sw. Kr. 2.50 per share (10 per cent as last year) plus a bonus of Sw. Kr. 0.50 per share is recommended. To bring the company's share capital into line with the size of its assets the share capital is being increased from Sw. Kr. 49,000,000 (£3,375,818) to Sw. Kr. 63,000,000 (£4,340,337) by issuing two new shares for each seven shares held.

Wanted ENGINEER FOR COAL MINING ORGANIZATION in India under British management, to take charge, in the first place, of group of collieries. Candidates if found suitable in the course of time have an opportunity of promotion to higher posts. Qualifications: Degree in electrical and mechanical engineering. Age: 30/35 years. Please reply to Box No. 3339, c/o Charles Barker & Sons Ltd., Gateway House, London, E.C.4.

MINING ENGINEER required for an Iron Ore Mine in Goa, Portuguese India. Applicants should preferably be between 35/45 and must have had at least five years experience in Iron Ore Surface mining.

Candidates should be Corporate Members of the Institution of Mining Engineers or equivalent.

The contract will be for three years and free living accommodation and transport is provided. There would be, however, six months probationary period before wife and family could join the successful applicant.

Applications should be accompanied by a recent photograph and addressed to Personnel Department, Ewbank & Partners Ltd., 10-11 Grosvenor Place, S.W.1.

GENERAL MANAGER
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The Company produces iron pyrites from opencast and copper concentrates from flotation plant. Applicants should have strong administrative qualities and in addition to mining and milling have good mechanical knowledge. Salary according to ability and experience. Two year tours with three months' leave on full pay. Family's passage paid, free furnished house and medical attention. No educational facilities for children. Applications which will be treated in strictest confidence, giving details of experience and personal information to Box 661, *The Mining Journal*, 15 Wilson Street, London E.C.2.

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The Mechanical Handling Exhibition, 1960

THE Mechanical Handling Exhibition, 1960, is being held at Earls Court from May 3 to May 13. Many of the exhibits are of interest in mining.

Industrial Machine and Equipment Co. (Brimpex) Ltd., announces that the new Brimpex auto-valve lifter will be introduced at this year's exhibition. This is an all purpose machine ideal for both raising and lowering of loads up to 2½ cwts. Lifting is therefore permitted by fully automatic lifting, semi-automatic lifting, and by complete hand valve control. Other equipment will be on show.

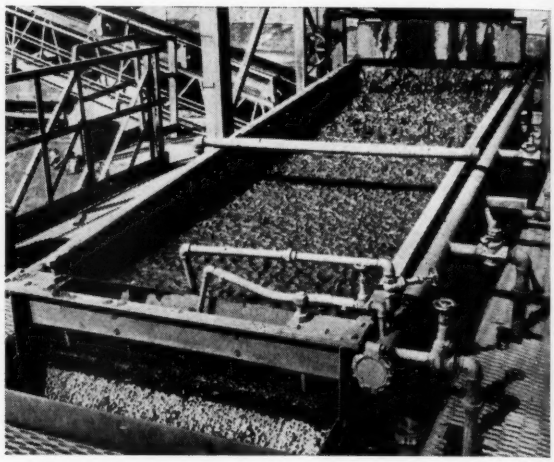
Locker Industries Ltd., will show a mechanical vibrating feeder to be known as the Locker Amplitrol, designed on the natural frequency principle. Also a Vimec distribution conveyor, designed to distribute material uniformly along the full length of the bunker over which it will be mounted. Also new designs of Locker electric vibrating feeders.

The display by *West's Group of Industries* will include examples of equipment manufactured by three members of the Group, screens, (ultra-resonance and vibrators) and jigs (for ore, sand, gravel, etc.), by West's (Manchester) Ltd., a new idler, the Camberoller, and a lip-bucket conveyor, by West's Gas Improvement Co. Ltd.; actuators and electrical control equipment by Tully Engineering Co. Ltd.

The West-Flämrich Ultra-resonance Screen to be shown is a 3 ft. x 10 ft. machine. These, like the West-Flämrich resonance screen, are manufactured in the United Kingdom and supplied in the U.K. and in the Commonwealth by West's (Manchester) Ltd. under licence from W. Flämrich, Western Germany.

The Wemco-Remer jig, widely used in the United States for the upgrading of aggregates and ores, has recently been introduced to this country under licence from the Western Machinery Company of San Francisco. The example shown will be a 3ft. x 1 ft. pilot machine.

The Goodyear Tyre and Rubber Co. (Great Britain) Ltd., will show a full range of conveyor belting, including a moving display, Armadillo chute lining, a representative selection of industrial hoses, including long length hose, a special display of oil suction and discharge hoses, a selection of V-belts, and transmission belting, including Goodyear endless cord belts.



The Wemco-Remer jig in operation

Sheepbridge Equipment Ltd., is a member company of the Sheepbridge Engineering Group. This company will be displaying an interesting selection of mineral and mechanical handling equipment.

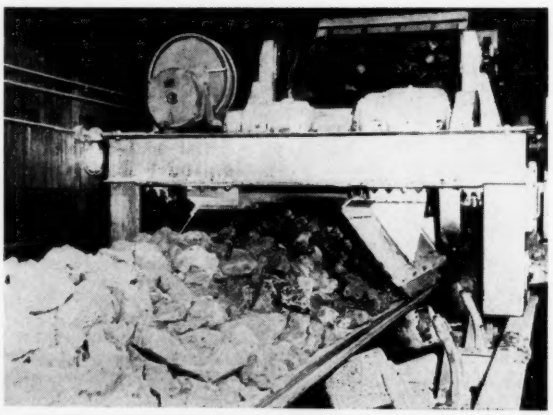
Twiflex Couplings Ltd., one of the Sheepbridge Engineering Group, will be exhibiting a working model of the Twiflex industrial disc brake.

Bray Construction Equipment Ltd. will be showing their new Centaur tractor for the first time. This is a four-wheel drive tractor with crawler performance.

New types of conveyor belting containing nylon in both warp and weft are the main feature of the display by *British Nylon Spinners Ltd.* Large quantities of belting containing nylon are used in British collieries. Other big users include hard stone quarries. Substantial quantities are also being sold overseas.

Thomas W. Ward Ltd. will show the Ensign portable flat belt conveyor, comprising a tubular welded boom, but fitted with a flat belt for handling cases, cartons, packages, sacks, etc.

A completely new range of mechanized equipment for handling in bulk process materials of many types. Known as the Dempster-Dumpster system, it is manufactured under licence in the United Kingdom by *Powell Duffryn Engineering Co. Ltd.* Representative items of this specialized equipment, which is used extensively throughout the United States, will be on view to British operators for the first time in this country at the exhibition. The Dempster system is an integrated system of vehicles and containers to facilitate handling.



Goodyear heavy-duty nylon fill conveyor belting contains nylon in the weft construction. It is built to take the strain of bigger pay loads

Ransomes and Rapier Ltd., will exhibit machines from the Rapier Range of mobile cranes and fork trucks.

Nypac — nylon wefted belt — in a full range of constructions will be shown for the first time by *BTR Industries Ltd.* The improved troughing and flexibility of this belting will be demonstrated on a working conveyor. A full range of surface and underground conveyor belting will also be exhibited.

Rapid Magnetic Ltd., will be exhibiting products which assist materials movement in all its forms. Electro lifting magnets, including the company's new Liftmaster, will be shown as will be the lightweight lifting magnets incorporating aluminium windings, and the Clover Leaf Magnet. Included in the display will be magnetic elevators and conveyors, a range of permanent magnetic concave rolls equipment for the magnetic separation of ferrous from non-ferrous swarf and other units.

Maxam Power Ltd., will have a working demonstration of a continuous roller-conveyor system which is operated by pneumatic valves and cylinders. The two-run roller conveyor will continuously pass five boxes through a complex system and halt, lift, lower, marshall and transfer them by means of fluid power equipment. Also to be exhibited is a range of pneumatic and other fluid power equipment for controlling and operating mechanical handling systems manufactured by Maxam Power Ltd., a member of the Holman Group of Companies, Camborne, Cornwall.

Electromagnets Ltd., will be exhibiting a working exhibit comprising an automatically controlled lifting magnet handling steel plates and scrap material. A second composite exhibit will comprise an inclined conveyor embodying a patent Boxmag magnetic conveyor head unit type MH. 1224. An example of a vibratory feeder will be exhibited by the associate company Blending Machine Co. Ltd.

Hugh Wood and Co. Ltd., will be showing a range of heavy duty conveyor equipment.

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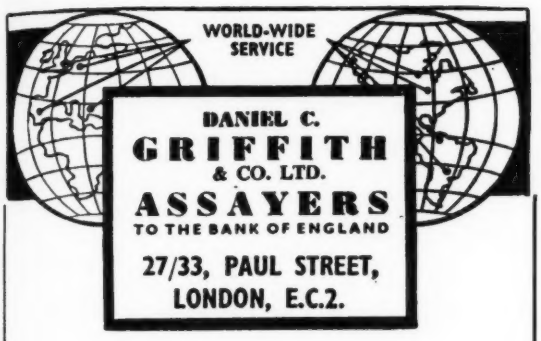

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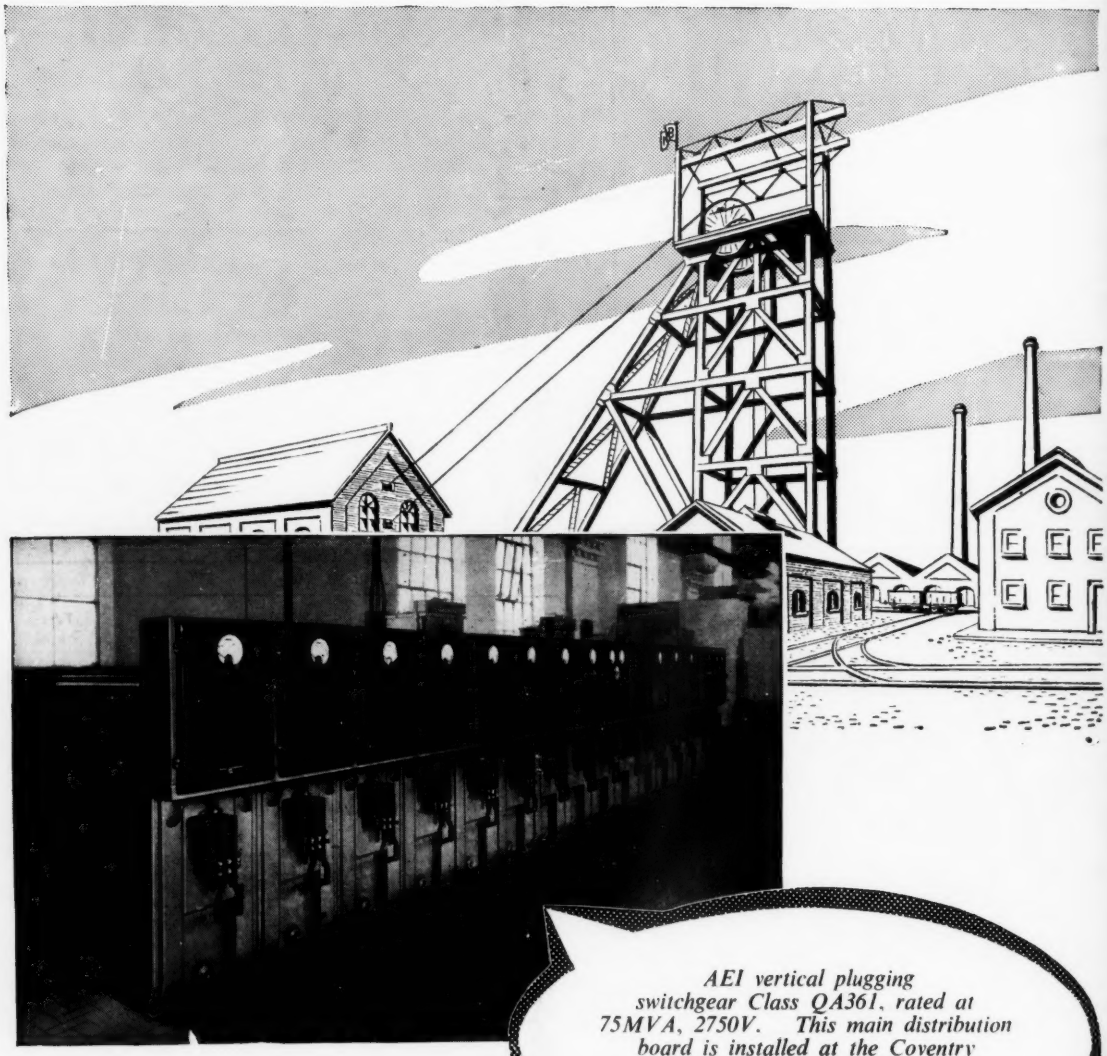

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